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Volume 23 **SEPTEMBER, 1940** **No. 9**

PREVENTION AND TREATMENT OF GENITAL PROLAPSE*

FRED L. ADAIR, M.D.
Chicago, Illinois

PROLAPSE is the falling downward or outward of a structure or organ, toward, into or through a natural or an artificial orifice. The term applies to specific structures only when a descriptive adjective or phrase modifies it.

The term Genital Prolapse as used in this discussion means a downward or outward displacement of all or of any portion of the female genital structures.

Inasmuch as such environmental structures as the urethra, bladder and rectum are so intimately associated with these genital organs, it is almost impossible not to have them involved in the process. It should be clearly understood then that there really is no such condition as an exclusively genital prolapse. Even as slight an involvement as a descent of the anterior or posterior vaginal wall implies some prolapse of the urethra or rectum.

The two major etiologic mechanical factors are those opposing forces of support and of pressure. Any disturbance of the equilibrium of these forces resulting in a relative excess of pressure over support will tend ultimately to cause a sagging of the tissues to a greater or a lesser degree.

The essential methods of prevention are those which eliminate the causes of inadequate support and of excessive pressure. The procedures for cure are the establishment and maintenance of a proper balance between support and counterpressure. It must be remembered that neither the support nor the pressure is rigid or constant but both are elastic and variable. There are complicated factors in the application of the force and of the resistance as they are both direct and indirect and may be shear or not. There are contributing factors which tend to alter the balance by increasing the pressure, by decreasing the resistance or by altering the mechanics of their application. The major factor seems to be associated with the processes of childbearing as these genital relaxations and descents are seldom seen in those women who have born no children. Occasionally even marked degrees of prolapse are found in nulliparous women but such cases are exceptions to the rule which prove that trauma to the supporting structures is not the sole factor to be considered in the etiology of these conditions. The forces which tend to cause a prolapse are twofold, the downward pressure from above by the intra-abdominal and intra-pelvic pressure and the pull or traction from below on the pelvic structures by the force of gravity.

The supporting or resisting forces are those of balance, which tend to hold the organs and structures in poise, by acting like guys on a derrick. These are the so-called ligaments of the uterus. While the cardinal ligaments may afford a measure of support they may be regarded as the swivel upon which the uterus swings. The real support comes from the endopelvic fascia or the urogenital diaphragm and from the pelvic floor which in turn is supported by the fibro-fat pads of the ischiorectal fossæ resting upon the powerful glutei maximi muscles. It has been mentioned that there are the forces of pressure and pull which are constantly present but are nevertheless variable in degree and in direction of application. The results vary not only because of these factors but also because of the altered relationship to the forces of resistance. The degree of the force

*From the Department of Obstetrics and Gynecology, The University of Chicago and The Chicago Lying-in Hospital. Read at the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, April 24, 1940.

of gravity cannot be altered except in accordance with the universal laws. The direction of pull could be modified by the posture of the woman, and if the erect position were not essential there would be no syndrome of genital prolapse. The effect of gravity is also modified by its relation to supporting or resisting forces as the direct pull is more effective than a shearing one. The former is seen where the inclination of the pelvic floor is destroyed by a perineal laceration and the structures are drawn downward through the vertical and widened genital canal. Less frequently one sees a prolapse where the normal inclination of the vaginal canal is preserved.

The effect of the force of gravity can be illustrated very simply by having a woman who suffers a prolapse alternately assume the standing and the recumbent position. The prolapse is obvious in the former posture and tends to disappear in the latter. Cases can arise in which the diagnosis of prolapse is missed on examination of the patient in the dorsal position. Atmospheric pressure also has to be considered. In the erect position it operates mostly through the abdominal walls, but if a woman is placed in the latero-prone, or better, in the knee-chest position with the posterior vaginal wall retracted, the effect on the normal or sagging genital structures can be easily demonstrated.

Intra-abdominal and intra-pelvic pressure is the composite result of many components, the chief of which are the external atmospheric pressure, which has already been mentioned, the action of the diaphragm, and the condition and physiology of the abdominal walls. The posture and attitude of the body has much to do with the relation between intra-abdominal and intra-pelvic pressure. In other words, the effect of the force of intra-abdominal pressure is altered by body posture.

It is apparent that certain components of intra-abdominal pressure cannot be eliminated. Atmospheric pressure is fairly constant. The muscular effort necessary to control and maintain the bodily movement and posture cannot be eradicated. Respiratory movements cannot be suspended. The physiologic activity of the abdominal muscles necessary to defecation and urination cannot be avoided. The major factor which can be controlled is that of voluntary effort or physical activity. Any severe strain or muscular effort of the abdominal wall tends to increase pressure within the abdomen. The effect of this pressure on the pelvic structures varies with the inclination of the pelvic brim and the position and the condition of the organs and structures within the pelvis. If the posture of the body is such that the brim of the true pelvis is more nearly horizontal then the pressure is more direct while the direction is more shearing when it has its normal inclination. If the uterus lies in retroversion because of a full bladder or other reasons the pressure is so exterted as to tend to push the uterus downward along the vaginal axis. If, on the other hand, the uterus lies in its normal position of anteversion the pressure tends to push the uterus forward and downward closing the utero-vaginal hinge.

Opposed to this force we have the adequacy of the structures surrounding the hiatus urogenitalis. This adequacy depends upon the size and direction of the hiatus and canal and upon the resistant and functional competency of the sustentacular pelvic structures.

The opening may be congenitally large or be stretched by parturition. The supporting structures may be weak from either congenital or acquired conditions. Among the most essential of these structures are the cardinal uterine ligaments which suspend the uterus near its isthmus and serve as a pivot upon which it turns. Another important component of the resistant and balancing forces is the endopelvic shelf upon which the uterus and bladder rest for support and beneath which the anterior vaginal wall runs downward and forward.

The posterior vaginal wall, passing along the thin partition of prerectal fascia, parallels the anterior vaginal wall and derives its support from the perineal and levator ani muscles and fascia which rest upon the ischiorectal pads protecting the rectum and resting as supporting cushions upon the powerful gluteal muscles. The laxity or weakness of musculo-fascial supports both above and below has a contributory effect in the production of prolapsed organs. It is easier to pour the contents out of the aperture in an inverted collapsible sack or bag than from a more rigid container as a jug or keg. The firmer and stronger the abdominal walls the greater their sustaining power on the abdominal and pelvic contents. This may be compared to the lifting or holding power obtained by a vacuum bottle or sucker. This restraining force from above is diminished if the aperture is larger or its periphery is weaker. One has to consider also

the relation between the pressure from above and the support from below because, if the former is disproportionately greater, prolapse is more apt to occur than if the latter is relatively stronger.

This rather brief discussion of some of the component etiologic and mechanical factors involved in the production of genital prolapse shows that they are manifold in degree and direction and in relative intensity of pressure and resistance. There must be as a rule certain lack of synchronization, and a persistance in the operation of these forces as the development of genital prolapse is not a sudden but a gradual process.

There is a coördinating factor which must be considered as important—when the abdominal muscles and diaphragm are thrown into action, whether voluntary or involuntary, physiologic or pathologic, there should be an equivalent timed response from the supporting structures lying below. If this were not true the pelvic structures would be forced downward. Under normal conditions this action may be compared to that of a hinge. The uterus swings forward and downward on its pivotal cardinal ligaments and acts as one leaf of the hinge. The other leaf is supplied by the levator ani and perineal muscles which tend to shut the hinge and close the opening of the lower genital canal. The resistance must be sufficient in degree and appropriate in timing to prevent the descent of the pelvic structures. It is also important that all the pelvic structures have sufficiently normal relations and be in condition to permit the physiologic operation of all these opposing but coördinated forces. Any situation which disturbs the physiologic behavior of these forces and tends to make the pressure overcome the resistance either in degree or in direction may cause a prolapse of genital structures or organs.

Prolapse is not a simple but a complex condition; it is not uniform but multiform in its manifestations. One structure or many structures may be involved, and it may be of a slight or of an extreme degree.

It is important to bear in mind that it is not a stationary but a progressive disorder because once the supporting structures are weakened and those of pressure overbalance the former the tissues and structures are gradually pushed to a lower and lower level. This is certain to occur unless something is done either to improve or supplement the support or to lessen the pressure. The former can be accomplished in various ways. The latter can be done only to a very limited degree as only pathologic pressure can be eliminated and certain essential physiologic pressure must remain. Prolapse of the rectum, urethra or bladder unassociated with genital prolapse will not be discussed in this presentation.

The simplest and most common form of genital relaxation involves the vaginal walls, usually the anterior or posterior or both. The lateral walls rarely sag unless the uterus descends. This sagging of the vaginal walls is referred to as colpocele, either anterior or posterior, and is caused by some atrophy or injury to the fascia and muscles supporting these structures. This is commonly caused by parturition as the result of pressure by the fetal head which injures these structures by stretching or tearing or by both. During labor the bearing down effort of the mother or the traction exerted during artificial delivery may pull down on these tissues so that the reparative or involutional processes never completely restore them. Even these lesser degrees of relaxation are uncommonly seen in nulligravida though some faulty development of the genito-urinary tissues with inherent weakness may result in even an extreme degree of prolapse. Excessive strain and hard physical work may overcome the natural resistance and produce a similar result. Occasionally, faulty innervation or other developmental defect associated with spina bifida occulta may be responsible for such a condition.

From the standpoint of the woman the most important point is whether or not any symptoms result from relaxation. These subjective signs may be urinary, gastro-intestinal, genital, pelvic or general and are not infrequently of an indefinite character.

Colpoceles rarely involve the vaginal walls alone as the rectum, urethra, and the bladder are so intimately and closely associated anatomically and physiologically that there is morphologic, if not functional, evidence of their implication.

When there are no symptoms, the degree of relaxation is slight and there is no evidence that the condition will be progressive. No treatment is indicated. When there is a definite urethrocele, some sacculation develops and terminal dribbling and incontinence may arise. When there is a rectocele, some difficulty in evacuation of the rectum occurs and this leads to the use of laxatives or enemas with the development of a cathartic or enema habit. Not infrequently a spastic colitis develops which cannot be cured until the pri-

mary muscular inefficiency is remedied. This can be accomplished only by operation which restores the muscular competency of the perirectal musculature and obliterates the rectal culdesac which arrests the fecal column. Commonly these foregoing conditions, which are designated urethroceles, cystoceles, and rectoceles, are progressive and the symptoms become aggravated. They form a background for more extensive genital relaxations.

Protrusion of parts is noted by the woman and necrosis, ulceration, bleeding and infection associated with purulent discharge may result. The patient complains of a sensation of pelvic weight and drag. Over a period of years this disability may cause more general symptoms with marked fatigability, loss of weight and incapacity for the usual activities even of those which are consistent with advancing years. The diagnosis presents little difficulty as the history and bimanual examination usually settle the question. It should be kept in mind that the relaxation is not so apparent on vaginal examination with the woman in the dorsal position. It is necessary to have her strain and bear down to bring the parts into view. Occasionally, it is desirable to examine her in the erect position. The diagnosis should include such details as are necessary to determine the exact situation and condition of the genital structures of the neighboring organs and tissues. One should determine whether or not the urethra and bladder and the rectum are involved and to what extent. The condition of the uterine cervix and the position, size, etc., of the uterus must be noted. Elongation of the cervix is common and is usually the result of stretching due to the holding or supporting of the corpus by its structures while the cervix is pulled downward as the result of gravity and insufficient support of the vaginal walls which are attached to the portio. We commonly speak of degrees of prolapse, but such a classification is arbitrary and incompletely descriptive of the condition. The uterus may descend to the lower portion of the pelvic canal without appearing at the introitus or the vaginal walls may be completely everted carrying the uterus along with them so that this organ no longer remains within the pelvis.

It is necessary in making a diagnosis to determine just what the conditions are as these determine in a large measure the type of treatment to be used. The treatment may be considered under four main headings: the prophylactic, the arrestive, the palliative and the curative. The prophylactic consists first of having women educated to assume proper posture and to secure normal physical development, and during pregnancy by early antepartum care, malpositions (as retroversions) of the uterus can be detected and corrected and the uterus can be maintained in proper position during the early months of gestation. Otherwise the tissues are soft, the uterus is growing and it may be held in the hollow of the sacrum under the promontory until the pressure of growth pushes it up and out of the pelvis. The replacement of such a retroverted uterus is usually easy and a Smith-Hodge pessary will maintain an anterior position until the uterus is large enough to ride above the pelvic brim about the third or fourth month. With the uterus in normal position the bladder and rectum can function more normally. The natural position and normal functioning of both rectum and bladder during pregnancy is important in preventing any overdistention or weakening of their walls.

During the first stage of labor it is important that the normal physiology be carried out. Any attempt to hurry or force delivery by bearing down or by traction with forceps, etc., on a cervix which is incompletely dilated may result in damage not only to the cervix but also to the surrounding and supporting structures of the upper vagina, the uterus, the bladder and the rectum.

The passage of the fetus, especially the head, through the birth canal stretches, tears and compresses the soft maternal tissues. They have excellent elastic properties but often irreparable damage is done and the supports are permanently weakened. Some but not all, of this injury can be avoided. Either too rapid or too delayed passage through the bony canal may be harmful. The former because actual tearing of tissues may result from lack of sufficient time in which to adjust themselves by gradual dilatation; the latter because of prolonged pressure with ischemia and necrosis of the tissues. In addition, there is always the question of infection which may interfere with proper tissue healing. It is difficult to lay down hard and fast rules as the proper conduct of labor is the result of good judgment and good technic. Both normal and artificial deliveries must be conducted with a proper regard not only for immediate but also for remote results.

Another important factor is the preservation of

the pelvic floor. Lacerations of varying degrees are common. It was formerly thought and taught that the criterion of a good delivery was the absence of a laceration. Very few, if any, primiparous women are delivered without some laceration or injury to the vaginal membrane, muscles or fascia of the pelvic floor or perineum. Some can be delivered without injury to the skin over the perineal body. The extent of the damage and the remote result cannot always be determined immediately. Suture of the open wounds which resulted has long been advocated. The tissues are often bruised, irregularly torn and difficult to approximate accurately. In view of the fact that these injuries are very common and cannot be avoided because they are often rather difficult to repair satisfactorily and for the reason that deeper lying tissues are often injured by overstretching, the operation of episiotomy has gained ground greatly in its use.

Median and mediolateral incisions are made; the latter is more commonly employed. This opens the pelvic floor, makes a clean-cut wound, and minimizes the amount of stretching of the musculo-fascial structures of the pelvic floor. It is easier to secure the proper apposition of the parts after an episiotomy than after an irregular laceration. One should restore the perineal wedge by reconstructing the backward inclination of the lower vagina and the introital ring. The sutures should approximate and not strangulate the tissues. Hemostasis should be complete and the perineal wound should be and should remain clean. Hematomas and infection interfere with normal healing and imperil both the immediate and the remote results.

Care during the puerperium is important as infection of lacerations and episiotomy wounds must be prevented, and if infection occurs, proper treatment by heat, drainage, etc., instituted. Strain on the traumatized tissues must be avoided as much as possible by avoiding fecal accumulation and difficult evacuation of the rectum. Overfilling of the bladder must be prevented. These measures are especially important during the first week while healing is taking place.

Exercises should be used to improve the tone and reëstablish the strength of the abdominal muscles. After the first week or ten days the latero-prone position, the knee-chest position and later even the monkey walk may be successively employed.

The patient should return for a postpartum examination in a month or six weeks, and if a retroverted uterus is found, its position should be corrected and a pessary worn for several months until the round ligaments and other supports are fully involuted and have returned to relative normality.

The knee-chest position is a valuable procedure for women to follow more or less routinely, especially for those who are susceptible to retroversion. Needless to say, the optimal physical status should be maintained. If certain degrees of relaxation are found, attempts should be made to arrest their progress by the attention to the patient's general condition, her habits and by local supportive treatment. It is important to avoid strenuous exercise which increases intra-abdominal pressure, to shorten periods of time, when the woman is on her feet either standing or working, by intervals of rest in the horizontal position. These measures will not cure the condition but may arrest or slow its progress.

Palliative treatment consists chiefly of the above suggestions and the use of some of the various types of hard rubber pessaries. The type varies with the case, and it is necessary to fit them carefully and check them monthly to see that no tissue damage is produced. They may cause irritation, discharge and decubitus if not used properly. The tissues of different patients react differently to the presence of such a foreign body. Some tolerate them for months and years and others have difficulty using them at all.

The only cure is surgical, and manifold operations have been devised but relatively few have stood the test of time. One may view the cures as symptomatic relief or as anatomic restorations. The former is what the patient desires, but it is often impossible to obtain it by any anatomic restoration which approaches the normal. Formerly, many procedures were advocated by which the uterus was removed with the result that the uterus no longer prolapsed but other structures did. It was anchored to the abdominal wall, but the tissues stretched and the parts descended.

Gradually the etiologic factors have come to be better understood and methods of reëstablishing proper mechanical relations have been devised. The various mechanical factors were discussed earlier and their practical application explained.

It is not possible to discuss in detail the va-

rious operative procedures which have been and can be used. The same operation cannot be used in all cases satisfactorily, but that procedure which makes it possible to use the principles to the best advantage is the one to employ in a given case. First, the tissues which support any relaxed part must be restored or so replaced as to provide the necessary support. This applies to the anterior vaginal wall, urethra and bladder as well as to the posterior wall and rectum. Second, accessory supports must also be restored or replaced. Third, provision must be made to maintain a balance between pressure and counter-pressure by a mechanism which will effectively close the hiatus when these two forces are opposed. The simile which appeals to me as most explanatory is that of a hinge. There must be some more or less fixed point on which the leaves turn. With the normal structures the uterus turns on its cardinal ligaments. Normally exerted pressure pushes it downward and forward into the uterovesical space and tends to compress the bladder between it and the endopelvic fascia. The cervix is thrown backward and upward and tends to close the vaults and tighten the vaginal walls and support the uterorectal pouch. The counter pressure from below is exerted by the levator and perineal muscles which raise the perineal body and posterior vaginal wall upward and forward to close the vagina and approximate the leaves of the hinge. If the uterus has a poor swivel, the mechanism fails, if the uterus lies in retroversion the hinge no longer closes properly, and if the lower leaf is defective the mechanism fails.

One has to consider two main facts in deciding upon an operation. One is that the childbearing function is to be preserved. The other is that no consideration need be given to further reproduction. In occasional cases no consideration need be given to marital relations. These viewpoints often exert a determining effect on the selection of the type of operation.

It is apparent that the removal or retention of the uterus modifies the procedure to be employed. It is obvious that no type of operation can be successful which does not provide a proper hinge-like action of the pelvic structures. Whether the uterus is removed or left, this mechanism must be maintained. This means a swivel and two leaves of the hinge, the one above and the other below. The normal uterine guys or substitutes must maintain the uterus in equilibrium. The cardinal ligaments or substitutes must be provided and the anterior and posterior vaginal wall supports must be restored or replaced. If the uterus is removed, the broad, the round ligaments and other supporting tissues must replace its function. Whether the operation is done from below or above or both, these principles must be followed. It seems apparent that all the necessary steps of such an operation cannot be accomplished solely by an abdominal operation.

The technic of these operations is not easy to acquire and can only be obtained by experience and training. It is said that "practice makes perfect"; the continued use of correct technic approaches perfection, the repetition of errors never produces perfection.

It is not possible, even with the best of technic, to secure cures either symptomatic or anatomic in all cases, but careful application of correct mechanical principles and the attainment of adequate operative technic will secure satisfactory results in the great majority of even extreme degrees of prolapse.

DIGITALIS FOR OBESITY

Too much publicity has apparently been given to the reports of a method of weight reduction which involves administration of digitalis for suppressing the appetite. Whether or not digitalis can produce a loss of appetite without harmful effects is debatable. The work of Hatcher and Weiss in particular has shown that the nausea produced by digitalis is a reflex the sensory organ for which does not appear to be located in the heart. Thus the type of nausea which digitalis produces is at least partly due to factors other than gastric irritation. Indeed, nausea and vomiting are toxic symptoms of digitalis and constitute a warning to decrease or stop the administration of the drug. Confirmatory evidence for this method of reducing body weight is lacking. The method cannot be generally recommended unless its efficacy and safety have been thoroughly demonstrated by carefully controlled observations. (J.A.M.A., June 8, 1940, p. 2311.)

THE LOCAL USE OF SULFATHIAZOLE IN THE TREATMENT OF STAPHYLOCOCCAL INFECTIONS*

Preliminary Report

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Minneapolis, Minnesota

RECENT developments in the field of chemotherapy include the successful use of sulfathiazole in the treatment of staphylococcal infections. We have recently participated in the treatment of fifteen patients from whose blood streams staphylococci were isolated before instituting specific therapy with this drug. In every instance, the blood was rendered sterile following the administration of sulfathiazole. Details of this experience with sulfathiazole in the therapy of patients with staphylococcal septicemia will be recorded elsewhere. We observed that whereas blood cultures remained sterile after sulfathiazole had been administered, and the patients' general condition improved, organisms could be consistently cultured from localized lesions. In other words, the drug appeared to control the infection, but there remained the potential danger of invasion of the blood again by microörganisms existing in primary or metastatic foci. Because of our failure to sterilize these focal lesions by the oral or parenteral use of sulfathiazole, we have treated a number of individuals by the direct application of sulfathiazole to the infected areas.† Although the number of patients treated in this manner is small, the results have been so encouraging that a preliminary report is warranted.

There has existed for many years a widespread interest in the local treatment of infections with antiseptics. The most popular of these chemical compounds are those whose action depends upon the slow liberation of chlorine. They include hypochlorite solution (Dakin's solution), chloramine-T, and dichloramine-T. While it is true that the latter compounds will actually kill microorganisms and have considerable merit, their use may result in damage to the delicate granulating tissue. Cushny[1] has stated, "They act at least as strongly upon the proteins of the human body as upon the microbes invading it." Fleming[2] has produced evidence that practically all of the antiseptics used in the past destroyed leukocytes. It is apparent that the ideal antiseptic would be one that injured or destroyed bacteria without causing damage to the tissues or cellular components of the host. In recent years, many investigators have advocated the treatment of infected tissues by less irritating and harmful measures. Lyth[8] has treated a total of 1,096 patients having infected wounds by the application of a hypertonic solution of sodium sulfate to the surface of the wounds. He was impressed by the rapidity with which the local edema subsided following the use of the saturated sulfate solution. Another less drastic method of treating infected wounds has been the local application of cod liver oil dressings. Lichtenstein[5] has recently reviewed the extensive literature on this subject and points out the advantages of employing this agent. He added experimental data of his own showing that cod liver oil is actually bactericidal for microorganisms which commonly invade injured tissue. Irradiation appeared to increase the activity of the cod liver oil. He suggested that the bactericidal action of the oil was dependent upon the organic peroxides that it contained. We have pointed out the success that has attended the use of these less irritative methods because we have utilized them in addition to the local use of sulfathiazole.

It should be pointed out that there exists some skepticism concerning the local use of sulfanilamide and its derivatives in the treatment of infections. Fleming[3] observed that bacteria and peptones inhibit the bacteriostatic action of sulfanilamide. Disintegrating leukocytes in a wound liberate proteolytic ferments, which in turn break down proteins to peptones. Lockwood[6,7] and others[9] have also shown that peptones inhibit the action of sulfanilamide. In the treatment of wounds, Fleming[2] advocates the oral administration of sulfanilamide; adequate drainage; and irrigation with hypertonic solutions, which will increase the rate of transudation and aid the local action of sulfanilamide which may reach

*From the Divisions of Internal Medicine and Surgery of the University of Minnesota Hospitals and Medical School, Minneapolis, Minnesota.

†Sulfathiazole was supplied by the Squibb Institute for Medical Research.

the infected tissue. We have been impressed with the success that Jensen and his associates at the Minneapolis General Hospital[4] have had following the implantation of sulfanilamide in contaminated wounds resulting from compound fractures. They have not observed a primary wound infection in thirty-nine compound fractures treated in this manner. Ninety-four open fractures treated in a similar manner but without sulfanilamide resulted in 27 per cent of the patients having infections.

Material and Methods

Sixteen patients with localized staphylococcal infections have been treated by applying sulfathiazole directly to the lesions. The following principles and procedures have been employed which appeared most likely to give the optimum therapeutic result in the therapy of these patients:

1. Depending upon the site of the lesion, immobilization and elevation of the infected area were used to enhance the return flow of the circulation. Wangensteen[10,11] has emphasized that such a procedure alleviates pain and reduces swelling.

2. Adequate surgical drainage and debridement of devitalized tissue were utilized.

3. Sulfathiazole was applied directly to the lesions to permit a much higher local concentration of the drug than could be obtained when it was given orally. In patients acutely ill, sulfathiazole was also administered by mouth. This procedure was directed against a possible bacteremia, and to prevent an extension of the primary focus. Several methods were utilized in impregnating the infected tissue with sulfathiazole. In some instances, sulfathiazole crystals were implanted directly into the septic part. A 1 per cent aqueous solution of sulfathiazole was also employed as an irrigant and in wet packs applied to the lesion. Since, as has been pointed out, the local application of cod liver oil is attended with beneficial effects, on some occasions, one per cent sulfathiazole was suspended in cod liver oil or included in a cod liver oil ointment with vaseline as a base, and the cod liver oil-sulfathiazole mixture placed directly on or in the infected part. More specific data pertaining to the use of sulfathiazole in these patients will be presented shortly.

4. To prevent the inhibitory action of bacteria, exudate, and necrotic tissue upon sulfathiazole, the wounds were irrigated frequently with warm, saline solution, and following each irrigation, sulfathiazole was put into the wound. In a few patients, particularly those with carbuncles, it was observed that irrigations with Dakin's solution aided considerably in the removal of purulent and sloughing material.

Results

A summary of the types of lesions treated and the results are shown in Table I. Staphylococci of the *aureus* type were isolated from every lesion. The following comments are presented to clarify the therapeutic method used in the various types of lesion:

Carbuncles.—Because of the size of the abscesses in all four patients, it was necessary to incise them and excise necrotic material. Following this procedure, sulfathiazole crystals were placed in the cavity of the wounds in three of the four patients. Additional crystals were put into the wounds daily for two to six days. It was surprising to observe how clean the wounds appeared following the application of the sulfathiazole. In treating the fourth patient, a one per cent suspension of sulfathiazole in cod liver oil was applied directly to the infected area twice daily for thirteen days. This method of application was also used in two of the three patients into whose cavities sulfathiazole crystals alone had been previously used. The utilization of the sulfathiazole-cod liver oil mixture compared very favorably with the use of sulfathiazole crystals. Two of the patients were so acutely ill that sulfathiazole tablets were administered orally. In two patients, dichloramine-T and Dakin's solution were used to aid in the removal of necrotic tissue. The lesions of three of the four patients healed rapidly without the use of skin grafts, while the lesion of the fourth patient appeared to be healing well until the use of sulfathiazole was discontinued, and suppuration recurred soon after. It is of interest that very little of the sulfathiazole appeared to be absorbed from the local area, since analyses of blood samples showed only traces of the drug present.

Operative Wound Infections.—The wounds of three of the patients were treated with a one per cent suspension of sulfathiazole crystals in sterile distilled water used as an irrigant. The wounds were irrigated two to three times daily, and dress-

ings saturated with the solution were applied. The results were highly satisfactory. The bacterial counts showed a considerable reduction in the number of colonies present within a day or two, and the degree of suppuration diminished at the same time. The wounds of two other patients were treated by applying a one per cent suspension of sulfathiazole crystals in cod liver oil to the surface. This was repeated three to four times a day for several days, and again the results were satisfactory. In one patient, sulfathiazole crystals were dusted on to the wound twice a day for ten days, following which the wound healed completely.

Decubitus Ulcers.—One patient was treated. The result was very gratifying in view of the previous attempts at therapy. The patient was a young male who had had a traumatic myelitis. Due to trophic disturbances, a large ulcer appeared over the sacral region. Staphylococci were cultured from the lesion. Attempts to control the infection included the use of packs saturated in saline solution and sulfanilamide powder dusted onto the involved area. Following this, two attempts were made to hasten epithelization with pinch skin grafts, but in each instance autolysis of the transferred skin took place. Finally, sulfathiazole crystals suspended in cod liver oil were applied three times a day for seven days to the ulcer. At the end of this time, the granulation tissue appeared clean, and an attempted skin graft was successful. The surface of the ulcer became completely epithelized.

Corneal Ulcers.—One patient with bilateral corneal ulcers was treated in coöperation with Dr. T. J. Edwards. The ulcers involved the greater part of the center of both corneæ. They had resisted several forms of local treatment over a period of a month, and it was thought for a time that the vision in both eyes would be lost. At this time, sulfathiazole crystals were dusted into each eye daily. A Saemisch section was carried out at the upper advancing margins of the ulcers of each cornea. Immediate improvement was observed, and after seventeen days of sulfathiazole therapy, the ulcers had healed completely.

Chronic Osteomyelitis.—A number of patients having chronic osteomyelitis had been previously treated with sulfathiazole administered orally. No apparent beneficial effect was observed. Two patients were treated by placing five grams of sulfathiazole crystals into the infected area. The first patient, a seven-year-old female, had osteomyelitis of the tibia. A sinus leading to the bone and the involved portion of the bone were debrided, and then sulfathiazole placed in the bony defect. A plaster cast was placed on the extremity. Four days later, the wound was examined through a window cut in the cast. It appeared clean, but staphylococci were isolated from the wound. Additional crystals were placed in the cavity, and the patient was sent home. Three months later examination revealed the wound to have healed, and an x-ray film showed extensive replacement of the defect in the tibia by new bone. A second patient has been treated recently in a similar manner, and further time must elapse before an opinion can be expressed concerning the effect of this therapy.

Pyo-pneumothorax.—This represents another type of lesion that we have attempted to treat with sulfathiazole. One patient, an adult female, had been receiving pneumothorax therapy for pulmonary tuberculosis over a long period of time. An effusion appeared in the air-containing right pleural cavity. Purulent exudate was aspirated from the cavity, and staphylococci isolated from the material. It was decided to aspirate the cavity thoroughly, and replace it with 250 c.c. of a one per cent aqueous suspension of sodium sulfathiazole. This was done on two occasions. Sulfathiazole was also administered orally. Microscopic examination of gram-stained smears of the exudate revealed myriads of cocci, a few of them intracellular. After the introduction of sulfathiazole into the pleural space, most of the organisms were intracellular, and those remaining outside of the cells stained poorly, and appeared abnormal in shape. However, the amount of fibrin had increased, presumably because of the alkalinity of the sodium sulfathiazole solution. An aqueous suspension of sulfathiazole was then used. Following this, the number of organisms was reduced, but staphylococci were consistently isolated from cultures of the exudate. This patient's general condition improved so much that a multiple stage thoracoplasty was begun to obliterate the cavity.

Subcutaneous Abscess.—An adult male with a large subcutaneous abscess had also received sul-

TABLE I. SUMMARY OF STAPHYLOCOCCAL LESIONS IN SIXTEEN PATIENTS TREATED WITH LOCAL APPLICATION OF SULFATHIAZOLE

Type of Lesion	Number of Cases	Results
Carbuncle	4	3 granulated in without skin grafts. 1 doubtful result.
Operative wound infection	6	All lesions rendered sterile. Healed.
Decubitus ulcers	1	2 previous attempts with skin grafts failed. After sulfathiazole, grafts successful.
Corneal ulcers	1	Sterile lesion with complete healing after sulfathiazole.
Chronic Osteomyelitis	2	1 showed extensive bone repair three months later. 1 therapy too recent to judge result.
Pyo-pneumothorax	1	Number of organisms reduced but cavity not sterilized.
Subcutaneous abscesses	1	Improvement. Died of leukemia.
	16	

fathiazole by mouth with no apparent effect on the abscess, but there was improvement in his general condition. Cod liver oil was applied to the subcutaneous lesion with but little improvement. Sulfathiazole in cod liver oil was then applied daily for thirty-two days. There was marked improvement following this therapy. The lesion granulated in, and partial epithelization took place. However, complete healing was not obtained. The patient expired because of myelogenous leukemia.

Comment

The ultimate goal in the treatment of all septic wounds is to control the infection and promote healing of the tissue. In evaluating any therapeutic measures, the time factor is of importance. While the observations have been few, operative wound infections appeared to heal more rapidly following the application of sulfathiazole than when other antiseptics were used. Final judgment is dependent upon comparative observations made upon a larger series of patients. The management of patients with staphylococcal sepsis must include effective therapy of localized lesions. While it is recognized that the oral and parenteral use of sulfathiazole will control staphylococcal bacteremia, complete eradication of focal infections is dependent upon other methods. If this is not accomplished, the localized infection may be the source of repeated bacterial invasions of the blood, which in turn may be followed by metastatic foci. Staphylococcal infections are notorious for this sequence of events.

It is quite likely that the best results with the local use of sulfathiazole will be obtained in those lesions that can be approached directly, such as infections of the skin and adjacent tissue. Its use in the management and control of chronic osteomyelitis merits further investigation. It is doubtful whether sulfathiazole introduced into the pleural cavity will completely control infections in this area. The use of sulfathiazole in cod liver oil appears very promising, and it is our intention to treat a larger number of patients in this manner. Emphasis must be placed upon the necessity of employing certain general principles of therapy, along with the local application of sulfathiazole, such as immobilization and gravity drainage, removal of necrotic tissue and purulent material; and frequent irrigation of the infected area.

Summary

1. Localized staphylococcal lesions in sixteen patients have been treated by applying sulfathiazole directly to the infected area.

2. The sulfathiazole preparations used have included sulfathiazole crystals alone; an aqueous suspension of sulfathiazole used as an irrigant and for saturating dressings; and sulfathiazole suspended in cod liver oil. In acutely ill patients, sulfathiazole was also administered orally.

3. The success of the local use of sulfathiazole is dependent, in great measure, upon maintaining a lesion free of purulent and necrotic material. This was accomplished by debridement and frequent irrigations.

4. The foregoing clinical results warrant further investigation of this form of therapy.

Bibliography

1. Cushny, A. R.: A Textbook of Pharmacology and Therapeutics. 9th edition, revised by C. W. Edmunds and J. A. Gunn. Philadelphia: Lea & Febiger, 1928, p. 161.
2. Fleming, A.: Antiseptics and chemotherapy. Proc. Royal Soc. Med., 33:127, 1940.
3. Fleming, A.: Observations on the bacteriostatic action of sulfanilamide and M & B 693 and on the influence thereon of bacteria and peptone. Jour. Path. and Bact., 50:69, 1940.
4. Jensen, N. K., Johnsrud, L. W., and Nelson, M. C.: The local implantation of sulfanilamide in compound fractures. Surgery, 6:1, 1939.

5. Lichtenstein, H.: God liver oil dressings: Their mode of action. Lancet, 2:1023, (Nov.) 1939.
6. Lockwood, J. S.: Studies on the mechanism of the action of sulfanilamide. III. The effect of sulfanilamide in serum and blood on hemolytic streptococci in vitro. Jour. Immunol., 35:155, 1938.
7. Lockwood, J. S., and Lynch, H. M.: Studies on the mechanism of action of sulfanilamide; Influence of proteolytic products on effectiveness of sulfanilamide. Jour. A.M.A., 114:935, 1940.
8. Lyth, J. C.: Hypertonic sodium sulfate treatment of infected wounds. Lancet, 1:216, 1940.
9. Spink, W. W.: The bactericidal effect of sulfanilamide upon pathogenic and non-pathogenic staphylococci. Jour. Immunol., 37:345, 1939.
10. Wangensteen, O. H.: The importance of immobilization and posture in the treatment of acute infections of the extremities. Minn. Med., 21:225, 1938.
11. Wangensteen, O. H.: The surgeon's rôle in the treatment of infection, Wis. Med. Jour., 37:629, 1938.

AIR-BORNE POLLEN IN THE TWIN CITIES AREA WITH REFERENCE TO HAY FEVER*

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CONSISTENT success with specific pollen therapy in the treatment of hay fever and pollen asthma demands an accurate and complete diagnosis of the causes for each case. Erroneous conceptions relative to the ultimate value of the skin test in the diagnosis of hay fever causes appears to be widespread among physicians, as judged from frequent and numerous personal communications received by one of us. That skin sensitivity and clinical sensitivity do not always coincide has long been known, a fact which we have previously emphasized.[10,11] That patients often exhibit positive skin tests to pollens which do not excite symptoms in the respiratory mucous membranes is a fact concerning which many physicians appear to be uninformed. This state of affairs would appear to indicate that the profession in general is not sufficiently informed concerning the periodicity of atmospheric pollution by the pollen of various species of plants, and considering the paucity of accurate information which has been available in this region until recently, such deficiency on the part of the general profession in the past is excusable. It is time we realize, however, that an *accurate* diagnosis of the causes of hay fever for the individual patient is possible *only when accurate data concerning the specific pollens which pollute the atmosphere in his locality coincident with his period of symptoms,* are available.

Following Blackley's work which proved the etiologic rôle of the pollens of certain grasses in connection with hay fever and seasonal asthma, evidence quickly accumulated that pollen from other plants was also involved. In the incomplete knowledge of that period the erroneous presumption arose that any plant producing pollen is a potential cause of hay fever. This early and somewhat hasty extension of Blackley's work led to many erroneous notions which are still widespread among the laity and also to an undesirable extent among physicians. The next important advance came with the realization that significant atmospheric pollution results only from those plants which pollinate through the agency of wind and hence only these are important potential causes of hay fever, which fact was pointed out by Scheppegrell[18] in 1917. Showy plants, such as roses, goldenrods, dandelions, daisies, and others which are often accused, were exonerated by the critically minded when it became recognized that the pollen of such plants is not wind carried. The significance of Scheppegrell's contribution deserves emphasis since it provided a basis for compilation of lists of wind-pollinated and therefore the potentially true hay fever causing plants in any particular region. Such lists were derived from botanical works and often with inadequate field observations. Following extensive field observations over a period of many years, such a compilation of the potential causes of hay fever for the State of Minnesota was published by us[10] in 1933. Notwithstanding a certain value attached to this kind of information, it leaves much to be desired, since it must be admitted that such evidence as related to hay fever is entirely circumstantial for it does not disclose whether as a fact or to what extent pollen of the plants listed actually pollute the air.

The application of the method of air analysis by means of pollen counts marked the next advance in knowledge of hay fever causes, and has supplied data of a more exact nature. The method which appears to have been devised by Airy,[1] involves the exposure of microscope slides coated with a viscous material for a definite time (twenty-four hours) and subsequent identification and

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enumeration by microscopy of the various kinds of pollen present on a definite area of slide surface. The date on which pollen grains of a given species first appear on the exposed slides determines *exactly* the beginning of atmospheric pollution by that species, the number over a given area of surfaces furnishes a quantitative index of the pollution and its complete disappearance indicates that the period of bloom of the species which produced it has ended.

It can be expressed as a dictum that the period during which the atmosphere contains appreciable quantities of pollen of a given species is to be regarded as the effective clinical period for the species. The thesis of this study has thus been one in which the data would give a diurnal measure of *all* kinds of pollen present during the entire season of pollination (late March through mid October in this region). It is only on such a basis that data, permitting the complete and accurate diagnosis of pollen sensitivity can be obtained, for as we have previously pointed out, [10,11] a positive skin test does not always indicate clinical sensitivity.

Methods

In obtaining daily records of the pollen content of the air, the so-called gravity method was used. This simple method consists of the exposure of an ordinary microscope slide (viscous coated) in the horizontal position, to the atmosphere for twenty-four hours. The material used for coating the slides was a mixture of three parts of petrolatum, one part of liquid paraffin oil, and one part xylol. If the ingredients are placed in a beaker and gently heated, a uniform mixture is obtained. This preparation is especially useful where prepared slides are being sent to distant stations for exposure. In order that slides might be obtained on rainy days, all slides were exposed under a protective cover, about 10 inches above the slide, which allowed free passage of air but yet excluded most of the rain. The enumeration of each kind of pollen was carried out as follows: Twenty-five microscopic fields (low power, 100X) systematically distributed across the width of the slide in five strips (Fig. A) were examined and the number of pollen grains of each kind recorded. The data thus accumulated may be used to express a quantitative estimate of the amount of atmospheric pollution during the period for which the slide was exposed.

Some workers[15] prefer to present this kind of data on the number of grains per square centimeter of surface, and Feinberg[6] has recently expressed the view that, of the several methods, this

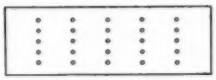


Fig. A. Position observed on exposed, oil-coated microscope slide (each circle represents a low-power field having, in our study, an area of 1.55 sq. mm.).

is the most practical and recommends its adoption as standard. The number of pollen grains per square centimeter of surface may be calculated as follows:

Area of 1 microscopic field (100X) in sq. mm. (1.55 sq. mm. in our study) X 25 (number fields counted)=area examined.
Since 1 sq. cm. = 100 sq. mm., then

$$\frac{100}{\text{Area examined (sq. mm.)}} = \text{Factor } (F_A) \text{ by}$$

which the number of pollen in twenty-five fields must be multiplied in order to obtain the approximate number occurring in one square centimeter of exposed surface.

Since Scheppegrell[19] devised the method, it has seemed desirable to express atmospheric pollen pollution in terms of the approximate number of pollen grains per cubic yard of air. This kind of information appears to be somewhat more tangible than the amount per surface area, notwithstanding the fact that the surface area values serve as the basis for the calculation of the pollen-grain-per-cubic-yard-of-air values, (application of Stokes' Law). Confusion recently has arisen concerning this method of expression of data, since Cocke[5,6] has called attention to certain errors in the factors devised by Scheppegrell[19] and our own investigations indicate that Cocke's corrected factors were also incorrect in certain instances. Detailed discussion of the controversies involved are beyond the scope of this paper; however the factors, recalculated and checked, used in calculating the pollen-grain-per-cubic-yard of air values, expressed as the B values in the accompanying figures, are presented in Table I. There is obviously a great need for a standard pollen count formulæ and it is hoped that the recently organized Committee on Aerobiology of the National Research Council will assist in bringing order to a rather uncertain state of affairs. It is pertinent to point out that from

TABLE I. FACTORS FOR CALCULATING APPROXIMATE NUMBER OF SMOOTH POLLEN GRAINS PER CUBIC YARD OF AIR

(Revised from Cocke)

If n = pollen grains per cubic yard, N = pollen grains per sq. cm. in twenty-four hours, and $F_{(B)}$ = the calculated factor, then

$$n = N \times F_{(B)}$$

Diameter of Pollen Grain (micra)	*Factor* ($F_{(B)}$)
10	28.93
12	20.09
14	14.76
15	12.86
16	11.30
18	8.93
20	7.23
22	5.98
24	5.02
25	4.63
26	4.28
28	3.69
30	3.21
32	2.83
34	2.50
36	2.23
38	2.00
39	1.90
40	1.81
42	1.64
44	1.49
46	1.37
48	1.26
50	1.16
60	1.80
70	0.59
80	0.45
90	0.36
100	0.29

a clinical standpoint it is of importance that pollen data demonstrate the following facts:

1. The approximate time (variability is not great) at which a specific kind of pollen annually makes its appearance in the air and when it reaches clinically significant concentration.

2. The duration of the period for which clinically significant amounts are present.

3. The date (approximate) at which the concentration drops below the level of clinical significance.

Regardless of the unit employed in the recording of data, when graphically portrayed most of these requirements are satisfied. Uncertainty and difficulties arise only in comparisons of data recorded by one investigator with that of another when different standards are employed.

In view of the present uncertainty of methods of calculation, we are expressing our data as shown in the accompanying figures on the following bases:

A. The number of pollen grains per square centimeter of slide surface exposed for twenty-four hours.

B. Pollen grains per cubic yard of air as calculated by Cocke's factors (Revised by the authors).

C. Pollen grains per cubic yard of air as calculated by Scheppegrell's factors.

The letters designating the above bases correspond to the respective values as they appear in the accompanying graphic presentations (Figs. 1 to 19). The values stated are the means of data collected at two stations: No. 1—Botany Building, University of Minnesota, exposure about 60 feet above ground; No. 2—Residence, South Minneapolis, exposure 15 feet above ground.

At Station No. 1, simultaneous exposure of slides at 20-foot and 60-foot levels have given evidence of a remarkably uniform concentration of pollen up to a height of about 60 feet. Scheppegrell[20] has stated that up to a height of about 150 feet pollen concentration is essentially uniform. Station No. 1 serves to give evidence of conditions in rather weedy areas since it is adjacent to such areas which border the Mississippi River. Conditions at Station No. 2 are more or less typical of the usual residential sections where waste places are not frequent, and weedy growths are kept fairly well in check. The data of these two stations do not differ greatly, but it is assumed that the mean of observations at these two localities probably represents average conditions prevailing in a large portion of the Twin Cities area. While the amounts of pollution as recorded in this study cannot be strictly applied to other localities in the state, the period of pollution, which is more important, is known to be the same in those regions which do not vary greatly as to latitude.

Various kinds of pollen (representing approximately sixty genera in about twenty families) found to contribute to pollution of the atmosphere, can be arranged into sixteen clinically convenient groups, as presented in a previous publication.[11] Present state of knowledge indicates the hay fever exciting substance in the pollen of closely related species to be the same. Patients sensitive to tall ragweed without exception exhibit positive skin tests to short ragweed, marsh elder, and other related weeds. A patient sensitive to oak pollen is sensitive to all species of oaks, et cetera.

The problem of diagnosis is greatly simplified through the reduction of a large number of species to a relatively few antigenic groups. The soundness of this principle has been proved through several years of application in the treatment of hundreds of cases.

Although the bulk of the data is presented in graphic form (Figs. 1 to 19) some discussion seems essential. The groups are presented in essentially chronological order, that is, from the standpoint of season. Plants are referred to by names which appear in Gray's Manual.[17] Likewise, the authors of the botanical names are those given in this work.

Group 1.—Maple, Box Elder Group (Family *Aceraceæ*)

Of this group, Soft Maple *(Acer saccharinum)* and Box Elder (*A. Negundo*) are of greatest importance, since they produce most of the pollen recorded. Box Elder is the only strictly wind-pollinated member of the group, the others being mostly insect-pollinated. Soft Maple is noteworthy since it is the first plant to shed pollen in this region. Field studies show that pollination may occur as early as March 12[18,19] Pollen concentration in the vicinity of Soft Maple trees would definitely be rather high, but since its rather large pollen grain (40 μ) lacks buoyancy, it is not carried for very great distances. Both stations have few Soft Maples in their immediate vicinity, and, as a consequence, the pollen count is low; the highest concentration for any twenty-four-hour period being 34 grains per square centimeter on April 9, 1933. The concentration of Box Elder pollen is strikingly different, for the highest count was 285 pollen grains on April 29 in 1934. Here would appear to be a good example of the rôle which mode of pollination plays in the provisions of the sensitizing agent for, as was stated earlier, Box Elder is strictly wind-pollinated while other maples are almost wholly insect-pollinated. The period April 21 to May 1 represents the time during which the pollen concentration is critically high. It is worthy of note that the records for three out of the four years are quite similar. In 1934 a cold, late spring caused the peak of pollen production to come about one week later than usual (Fig. 1). Such variations in temperature are of importance, since they are correlated with rather marked changes in pollen concentration.[7,19]

Group 2.—Birch, Hazel, Ironwood Group (Family *Betulaceæ*)

Members of this group are not overly abundant in the areas immediately surrounding the two stations, which fact probably accounts for the variability seen in the data. Pollen grains of birch and its allies (which average about 30 μ in diameter) are quite buoyant and are therefore carried by winds for some distance. Indeed, pollen grains of the birch family have been caught 34.1 miles out in the sea and at heights of more than 2,000 feet in the air.[4] Likewise Erdtman[13] has observed occasional pollen grains of Alder at a distance of more than 400 miles off the coast of Newfoundland. It is thus to be expected that alteration of either wind velocity or wind direction and the occurrence of rain would contribute to the variability seen in the pollen concentration (Table II). Relatively high pollen counts are attained during the period April 28 to May 11. The entire pollinating season extends from April 7 to May 30 (Fig. 2).

Group 3.—Poplar, Willow Group (Family *Salicaceæ*)

Cottonwood (*Populus deltoides*), which belongs in this group, produce large quantities of pollen. At the peak of pollen production in 1934 (April 28), the concentration was 1,013 grains per sq. cm. The extent of the season during which the pollen count is of importance is about ten to twelve days, beginning with April 20. High concentrations were observed on April 23 and 24 during three out of the four years. The willows are largely insect-pollinated and their pollen never fills the air to the extent that cottonwood pollen does. Since the exine (outer wall) of their rather small pollen grains (25 μ in diameter) is finely ridged (striate-reticulate), most of the pollen occurs in masses heavy enough to fall rather quickly to the ground. However, some pollen of various species of willow (Pussy-willow—*Salix discolor*, sand-bar willow—*S. Longifolia*, Peach-leaved willow—*S. amygdaloides*, Weeping willow—*S. babylonica*, et al) are consistently found on the slides. During the first half of May the maximum concentration may be as high as 74 pollen grains per square centimeter (May 3, 1935). Since various kinds of willows pollinate throughout May, they serve to prolong the pollination period of this group (Fig. 3).

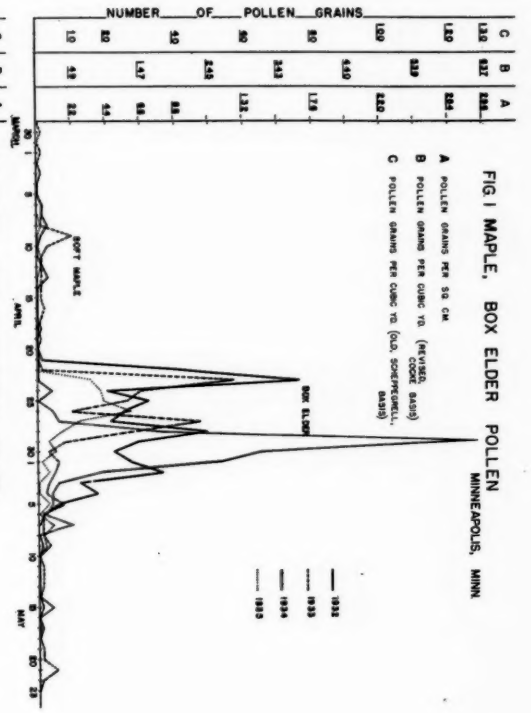


FIG. 1 MAPLE, BOX ELDER POLLEN
MINNEAPOLIS, MINN.

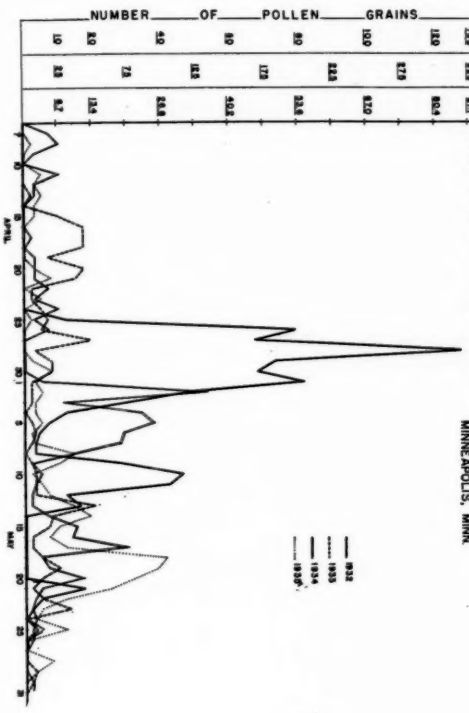


FIG. 2 BIRCH, HAZEL, IRONWOOD POLLEN
MINNEAPOLIS, MINN.

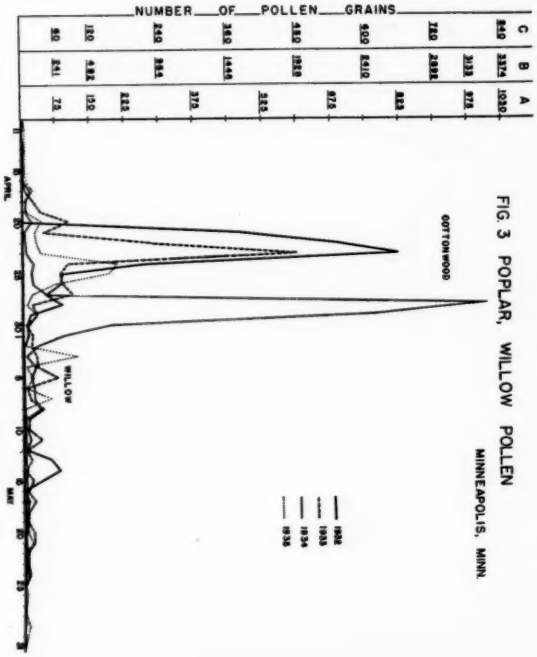


FIG. 3 POPLAR, WILLOW POLLEN
MINNEAPOLIS, MINN.

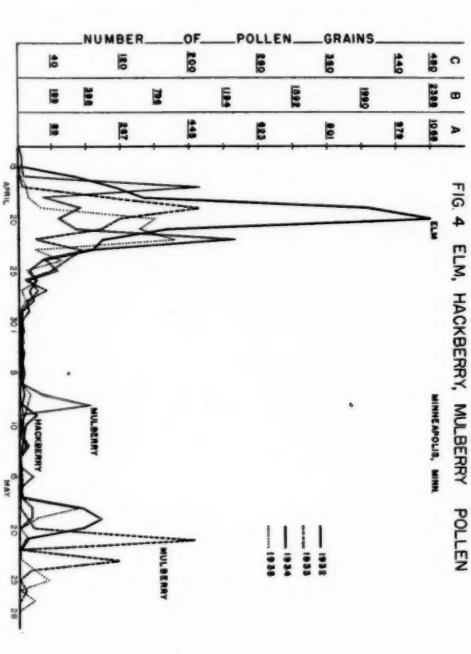


FIG. 4 ELM, HACKBERRY, MULBERRY POLLEN
MINNEAPOLIS, MINN.

TABLE II. DATA SUMMARIZING THE BEHAVIOR OF AIR-CARRIED POLLEN

Group	Total pollen count (Summation of daily 24-hour concentrations) (number per sq. cm.)					Duration of pollination (four years' data)	Date of Highest Pollen Count (Mean of two stations)				Highest 24-hour Count (in pollen grains per sq. cm.)	
	1932	1933	1934	1935	Average		1932	1933	1934	1935	Station 1	Station 2
I. Maple, Box Elder	924	609	793	271	650	3/22- 5/23	April 23	April 23	April 29	April 26	505	
II. Birch, Hazel	979	346	542	465	583	4/ 7- 5/30	April 28	May 13	May 2	May 18	193	
III. Cottonwood	2,703	1,817	2,364	904	1,947	4/ 7- 5/31	..	..	..	..	..	..
a. Cottonwood	2,560	1,540	2,221	714	1,759	4/11- 5/20	April 23	April 23	April 28	April 25	1911	
b. Willow	143	277	143	190	188	4/ 7- 5/31	May 14	May 5	May 1	May 3		93
IV. Elm, Nettle	4,338	2,233	2,381	2,040	2,748	4/ 8- 9/20	..	..	..	..	..	..
a. Elm	3,667	1,704	1,978	1,395	2,186	4/ 8- 5/ 6	April 20	April 19	April 22	April 22		1125
b. Hackberry	67	42	31	61	51	4/27- 5/23	May 9	May 12	May 7	May 21	44	
c. Mulberry	78	112	44	74	77	5/ 6- 6/ 3	May 19	May 21	May 8	May 18		70
d. Nettle	267	222	173	312	243	6/ 7- 9/10	July 25	Sept. 8	July 21	Aug. 11		70
e. Hemp	259	152	155	198	191	6/22- 9/20	Aug. 5	Aug. 21	Aug. 6	Aug. 14	23	
V. Sedge, Bulrush	29	245	112	122	165	4/25- 8/ 3	..	..	..	..	..	..
a. Sedge			21	40	31	4/25- 6/ 5	..	..	May 4	May 18	8	8
b. Bulrush	29	82	24	36	43	6/ 7- 8/ 3	July 18	June 7	July 23	July 16	11	11
c. Cat tail		162	67	46	92	6/10- 7/29	..	June 26	June 28	June 30	55	
VI. Ash	262	143	327	262	248	4/24- 5/31	May 4	May 6	May 1	April 25		177
VII. Oak	3,275	1,935	3,007	689	2,227	4/29- 6/10	May 14	May 19	May 7	May 25	1615	
VIII. Grass	3,302	946	342	1,879	1,617	5/17-10/18	June 7	June 1	July 21	June 13	462	
IX. Butternut, Walnut	161	51	198	53	116	5/ 5- 6/18	..	..	..	..	..	..
a. Butternut	75	13	62	7	39	5/ 8- 6/ 3	May 23	May 23	May 17	May 28		44
b. Walnut	29	4	42	7	20	5/ 8- 6/11	May 28	May 22	May 17	June 10		17
c. Hickory	57	33	93	40	56	5/ 5- 6/18	June 2	June 1	May 20	May 31	13	
X. Plantain	207	21	38	19	71	5/27- 8/ 6	June 24	June 22	May 27	June 17	40	
XI. Dock, Sorrel	874	55	63	135	282	5/20- 8/14	June 7	June 11	July 10	June 17	169	
XII. Sweet Clover Alfalfa			20	16	18	6/26- 9/ 1	..	..	June 26	July 20	6	6
XIII. Pigweed												
XIV. Russian Thistle	749	928	1,587	861	1,031	6/ 2-10/17	Aug. 29	Aug. 16 July 24	Aug. 21	Sept. 24	95	
XV. Wormwood, Sage	759	223	124	255	340	7/ 3-10/16	Sept. 23	Aug. 29	Sept. 13	Sept. 17	59	
XVI. Ragweed	6,319	6,307	6,080	9,574	7,070	7/ 2-10/17	Aug. 29, 30	Aug. 31	Aug. 29	Aug. 23	1225	
TOTAL	24,882	15,860	17,981	17,546	19,114							

TABLE III. SKIN SENSITIVITY IN RELATION TO CLINICAL SENSITIVITY
Analysis of 936 Cases

Nos.	Groups	Patients with Pos. Skin tests		Patients Clinically Sensitive		% of Positive Skin Reactors with Clinical Sensitivity
		No.	% of Total	No.	% of Total	
	Aceraceæ (Maple-Box Elder)	425	45.4	45	4.8	10.6
	Betulaceæ (Birch-Hazel)	182	19.4	21	2.2	11.5
	Salicaceæ (Poplar-Willow)	230	24.6	37	4.0	16.1
	Urticaceæ (Elm-Nettle)	226	24.1	207	22.1	91.6
	Cyperaceæ-Typhaceæ (Bulrush-Cat tail)	231	24.7	139	14.9	60.2
	Oleaceæ (Ash)	330	35.3	36	3.8	10.9
	Fagaceæ (Oak)	290	31.0	60	6.4	20.7
	Gramineæ (Grass)	490	52.4	462	49.4	94.3
	Juglandaceæ (Walnut-Hickory)	207	22.1	37	4.0	17.9
	Plantaginaceæ (Plantain)	219	23.4	80	8.5	36.5
	Polygonaceæ (Dock-Sorrel)	279	29.8	81	8.7	29.0
	Leguminoseæ (Clover-Alfalfa)	315	33.7	190	20.3	60.3
	Amaranthaceæ (Pigweed)	584	62.4	461	49.3	78.9
	Chenopodiaceæ (Russian Thistle)	422	45.1	398	42.5	94.3
	Artemesiæ (Sage-Wormwood)	726	77.6	687	73.4	94.6
	Ambrosiaceæ (Ragweed)	835	89.2	776	82.9	92.9

Group 4.—*Elm, Nettle, Hemp Group* (Family *Urticaceæ*)

The various plants placed in this group all belong to the Nettle family; but since their season of pollination variously occurs from April through September, they have been placed into two subdivisions (Fig. 4—Elm, Hackberry, and Mulberry; Fig. 5—Nettle and Hemp). The Elms (*Ulmus americana* and *U. fulva*) pollinate within the period April 15 to 30, the maximum concentration being observed on about the 20th (1,062 pollen grains per square centimeter of surface April 20, 1932). These trees are capable of producing large quantities of buoyant* pollen and are relatively important since they are widely planted.

The explosive flowers of Mulberry (*Morus alba*) produce quantities of small pollen grains (16 μ in diameter). The latter half of May represents its normal pollination period; although in 1934 its maximum (25 pollen grains on May 8) came about two weeks earlier than usual. Hackberry (*Celtis occidentalis*) pollen has not been abundant on the slides. The highest concentration observed (usually occurring about May 10) was 25 pollen grains per square centimeter on May 9, 1932. Its pollination season extends throughout the first half of May (Fig. 4).

Nettles *Urtica gracilis, U. dioica, Laportea canadensis*) produce the smallest sized pollen grains noted in this survey (15.8 μ in diameter). They are common, widespread weeds (cf. distribution map[11]) which normally produce pollen from about the first of July to September 10. Maximum pollen production has been observed about July 25 in 1932 and 1934, while the years 1933 and 1935 have shown highest counts during August 29, 1933; August 11, 1935). The pollination period of Hemp (*Cannabis sativa*) is essentially the same as for nettle. Its pollen grains, which are about twice the size of those of nettle, have been relatively sparse, 23 being the highest twenty-four-hour count (August 6, 1934). Max-

*The occurrence of elm pollen grains on the slides a month in advance of their normal appearance very definitely suggests that they can be transported for rather great distances. During this period elms were shedding pollen in the vicinity of Chicago, Illinois.

imum pollen production is attained during the first half of August (Fig. 5).

Group 5.—Sedge, Bulrush, Cat tail Group (Families *Cyperareæ* and *Typhaceæ*)

As a group, these plants have never been thought of as of any great significance in the causation of hay fever. The fact remains that numerous patients are sensitive by skin test to the group (24.7 per cent of 936 cases. See Table III). Further, plants belonging in this group are often abundant in places frequently used as summer resorts or "hay fever havens."

Pollen grains of various sedges (*Carex pendunculata, C. longirostris, C. pennsylvanica, C. vesicaria, et al.*) have been noted during the period May 4 to June 5 (1934 and 1935)). A low maximum of 8 pollen grains per square centimeter was noted on May 18, 1935.

Cat tail (*Typha latifolia*) produces large quantities of pollen grains, which usually remain together in groups of four (quartets or tetrads). Its season of pollination extends from June 10 to about the middle of July with highest concentration occurring with the close of June (June 26, 1933). During approximately the same period, pollen of various species of Bulrush (*Scirpus validus, S. fluviatillis, S. atrovirens,* et cetera) occurs in the air. It is most abundant around the 18th of July (Fig. 6).

Group 6—Ash Group (Family *Oleaceæ*)

Data of the first three years of this survey suggest that the usual period during which various species of Ash (*Fraxinus pennsylvanica* var. *lanceolata and F. nigra*) pollinate is from April 25 to May 17. During 1935, with rather cold, rainy weather, the pollination season persisted until the end of May. Highest pollen concentration (e.g., 99 pollen grains per square centimeter on May 4, 1932) is usually attained during the first week in May (Fig. 7).

Group 7.—Oak Group (Family *Fagaceæ*)

Various oaks (White Oak—*Quercus alba,* Bur Oak—*Q. macrocarpa,* Hill's Oak—*Q. ellipsoidalis,* and Red Oak—*Q. borealis*) are important hay fever causing plants during the month of May. They produce large quantities of pollen and are widespread in their distribution. Pollination extends throughout May. In 1932 a maximum concentration of 1,303 grains per sq. cm. occurred on May 14. With excessively high temperatures in 1934 a peak of 1,083 pollen grains was observed on May 7, while in 1935 rather cool, rainy weather delayed the appearance of the very low peak until May 25 (Fig. 8).

Group 8.—Grass Group (Family *Gramineæ*)

During the very last days of May and preeminently throughout June, pollen of this very important group is predominant in the air. Seasonal maxima have occurred on June 7 (in 1932, 213 pollen grains per square centimeter) and on June 13 (in 1935, 403 pollen grains). It is during this period that the very abundant grasses such as June Grass (*Poa pratensis*), Spear Grass (*P. annua*), Hungarian Brome Grass (*Bromus inermis*), Orchard Grass (*Dactylis glomerata*), and Reed Canary Grass (*Phalaris arundinaceæ*) come into their period of most profuse flowering. Timothy (*Phleum pratense*) and Quack Grass (*Agropyron repens*) begin pollination during the last days of the month (Fig. 9).

The period during which this survey has extended has been most interesting for the tendencies especially evident in this group, and also in two others which are to be subsequently mentioned. During the period 1932 to 1934 there was a very distinct and increasing deficiency in the amount of precipitation. The devastation which this factor brought to our grassland pastures needs little emphasis. Reference to Figure 9 will show that the pollen curve for 1932 does not approach the base line until July 2, while in 1933 and 1934 the curves closely approach or coincide (note the 1934 curve) with the base line much of the time. Correlated with a distinct increase in the amount of precipitation during 1935 is a striking change in the pollen curve for this year. Indeed, the highest twenty-four-hour concentration of grass pollen ever recorded in this survey came during this year on June 13. This striking occurrence may well serve to exemplify the drought-resistance of the grasses. The total grass pollen count recorded for each of the four years in Table II indicates how markedly pollen production has varied.

Pollen of the various late-pollinating grasses (Grama or Mesquite Grass—*Bouteloua curtipendula, B. hirsuta;* Satin Grass—*Muhlenbergia mexicana;* Blue Stem—*Andropogon furcatus,* Sand Reed—*Calamovilfa longifolia,* et al.) are present in the air, though in rather small quan-

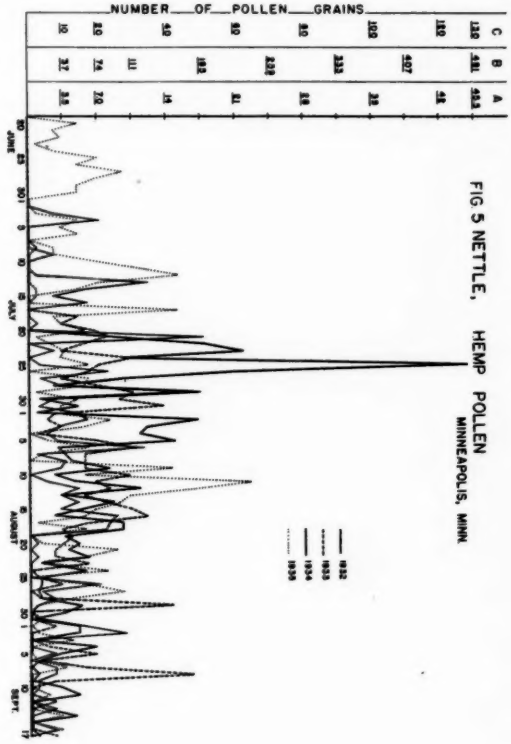


FIG 5 NETTLE, HEMP POLLEN MINNEAPOLIS, MINN.

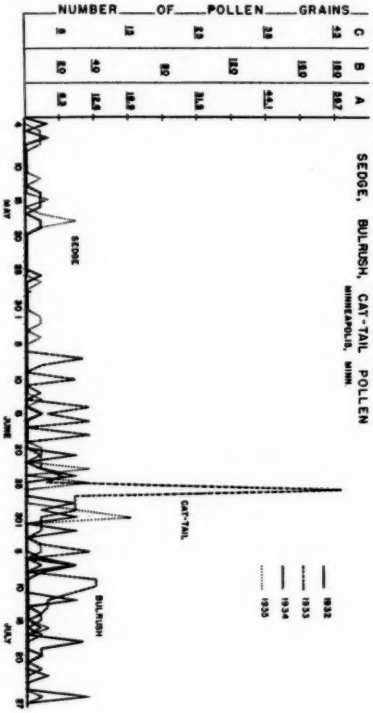


FIG 6 SEDGE, BULRUSH, CAT-TAIL POLLEN MINNEAPOLIS, MINN.

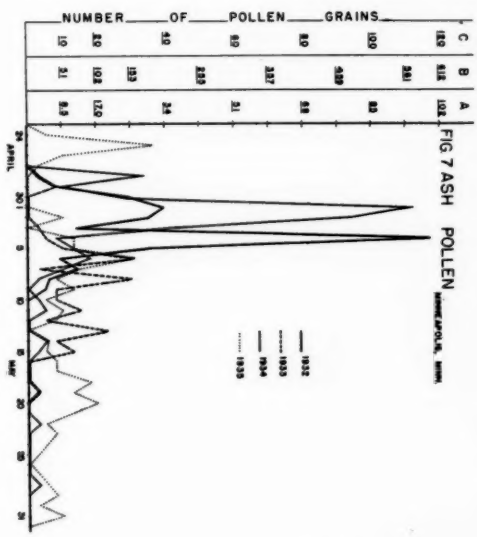


FIG 7 ASH POLLEN MINNEAPOLIS, MINN.

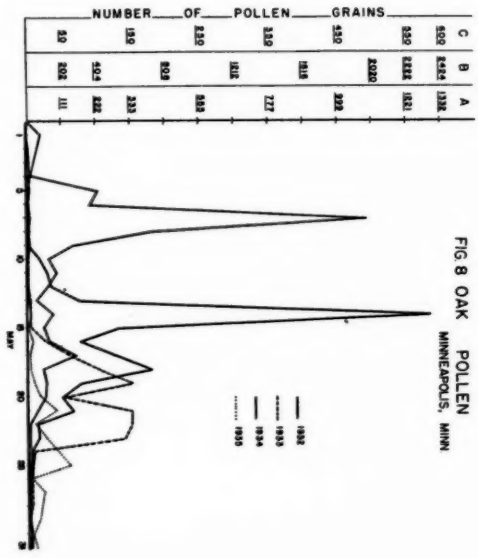


FIG 8 OAK POLLEN MINNEAPOLIS, MINN.

tities, during July, August, and September. This fact very definitely suggests that grasses must be considered as possible contributors to late summer hay fever. In the past their omission, as well as of other so-called "minor" groups, has resulted in an inadequacy of diagnosis and consequently of treatment of such cases.

Group 9.—Butternut, Walnut, Hickory Group (Family *Juglandaceæ*)

Slides exposed during the period May 8 to June 19 have shown pollen grains of this group. The rather large grains which these trees produce (Juglans—39 μ in diameter, Carya—53 μ in diameter) have not been very abundant. On May 23, 1932, a peak of 27 pollen grains was noted, while in 1934 a peak of 38 grains occurred on May 17 (Fig. 10).

Group 10.—Plantain Group (Family *Plantaginaceæ*)

Except for observations during 1932, pollen grains of plantain (Rib grass—*Plantago major, P. Rugelii*) have been very occasional. During the last three years of the survey the number of plants occurring in the vicinity of the exposure stations has been markedly reduced by weed cutting and by extreme drought. Pollen is shed from mid-June to the first part of August with a maximum concentration being attained by the 24th of June (Fig. 11).

Group 11.—Dock, Sorrel Group (Family *Polygonaceæ*)

Included in this group are various species of Dock and Sorrel (*Rumex acetosella, R. mexicanus,* and *R. crispus*). The unusually high concentration noted in 1932, as compared to the very low counts recorded in the three years that followed, appears to be due to the same factors discussed in the previous group. Pale Dock (*R. mexicanus*) in the immediate vicinity of Station No. 1 was especially productive of pollen during 1932. Pollination has been noted from May 20 to July 22, with the peak of pollen production occurring between the 7th and 17th of June (Fig. 12).

Group 12.—Sweet Clover, Alfalfa Group (Family *Leguminosæ*)

Since Sweet Clover (*Melilotus alba, M. officinalis*) and Alfalfa (*Medicago sativa*) are insect-pollinated plants, it is somewhat strange that they should receive consideration in this communication. However, their flowers are so constructed that a mass of rather small, dry pollen (32 μ in diameter in *Melilotus*) is ejected whenever insects visit ("trip") them. This would mean that in rural regions where these plants are abundant, pollen concentration can attain sizeable proportions. On slides exposed at the two stations Sweet Clover has been observed only during 1934 and 1935, within the period June 26 to July 22. The highest concentration noted was 6 grains per square centimeter. (Fig. 14).

Group 13 and 14.—Chenopod Group (Families *Chenopodiaceæ, Amaranthaceæ*)

Abundant and widespread weeds of importance as causes of hay fever belong to this group. The pollen grains of the *Amaranthaceæ* are not distinguishable from the *Chenopodiaceæ* (cf. Wodehouse[25]) and as a consequence Figure 14 gives a summary of both groups. In general, the period July 1 to September 25 represents the period during which critical concentrations are attained.

During July, Russian Thistle (*Salsola Kali* var. *tenuifolia*), Pigweed (*Amaranthus retroflexus*), and Lamb's Quarters (*Chenopodium album*) rank as being of greatest importance. Pollen of Burning Bush (*Kochie scoparia*) usually attains its greatest frequency during August. Maxima for the group have occurred as follows: On August 16 in 1933 (57 pollen grains), on August 21 in 1934 (82 pollen grains—the highest count observed during the four years), on August 29 in 1932 (59 grains), and on September 24 in 1935 (65 grains). Of the total pollen production for the season 49.1 per cent occurs during August. During 1935 high concentrations (up to 46 pollen grains) also occurred during mid-August. As with the grasses, a comparison of the yearly totals (Fig. 18) reveals a striking relationship between the amount of pollen and the lack of rainfall, though in a different manner. With increasing dryness there is noted an increase in the total amount of pollen. This fact finds explanation in the tremendous increase of Russian Thistle (*Salsola Kali* var. *tenuifolia*) in areas ordinarily occupied by grasses during years with normal rainfall.[19] With an increase in precipitation during 1935 there was a decrease in total amount of Chenopod pollen which is correlated with the fact that conditions were again

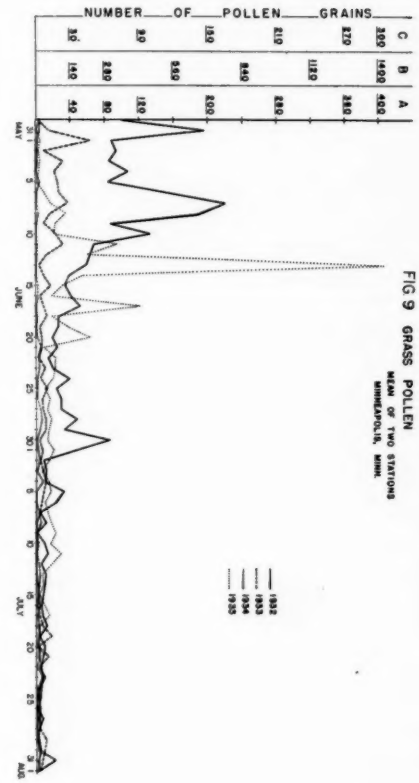


FIG 9 GRASS POLLEN
MEAN OF TWO STATIONS
MINNEAPOLIS, MINN.

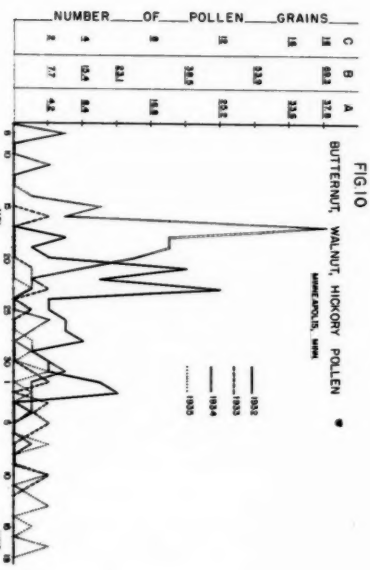


FIG 10
BUTTERNUT, WALNUT, HICKORY POLLEN
MINNEAPOLIS, MINN.

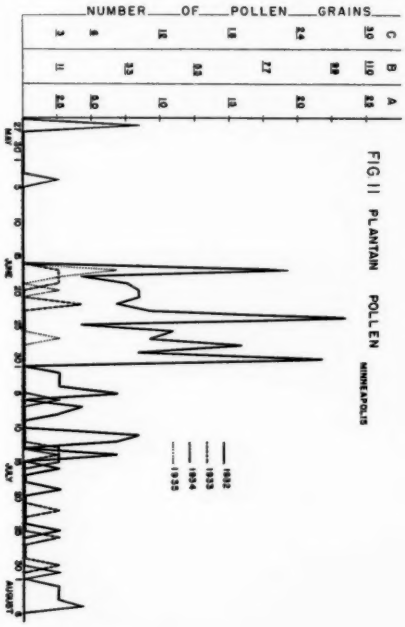


FIG 11 PLANTAIN POLLEN
MINNEAPOLIS

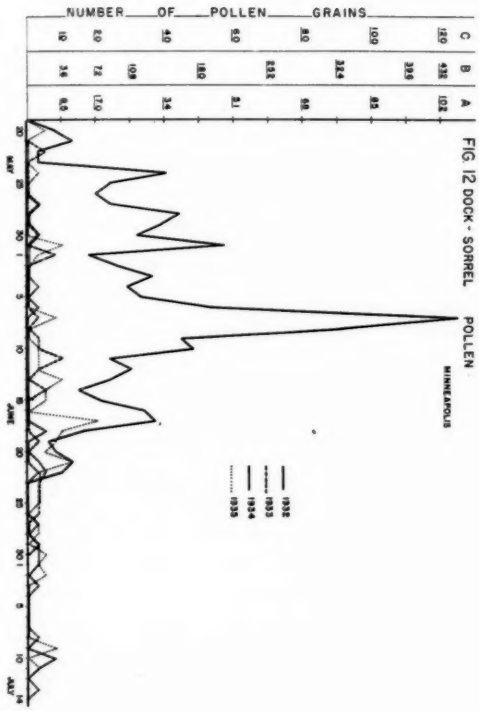


FIG 12 DOCK - SORREL POLLEN
MINNEAPOLIS

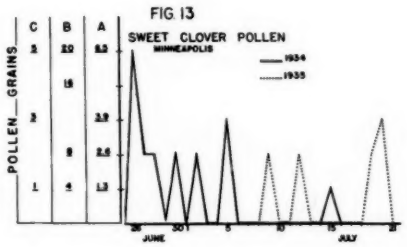
suitable for other plants in addition to the Chenopods.

Group 15.—Wormwood Group (Family *Compositæ*)

While the pollen concentration of this group has never been as high as that observed for such groups as Ragweed, Chenopod and Grass, it still must be considered as a rather important element involved in many cases of late summer and fall hay fever.[9,10,11] The various kinds of Wormwood or Sage (*Artemisia vulgaris, A. dracunculoides, A. caudata, A. biennis, A. frigida,* and *A. ludoviciana*) contribute to a rather long season of pollen production (from July 6 to October 7). Seasonal maxima may occur after the middle of September (September 17 in 1935—25 grains per square centimeter; September 23 in 1932—44 grains). This fact takes on greater etiologic importance when it is realized that 75 per cent of the cases sensitive to the Ragweed Group are also sensitive to this group. Wormwoods can thus serve to prolong the potentially troublesome season (Fig. 15).

Group 16.—Ragweed Group (Family *Compositæ*)

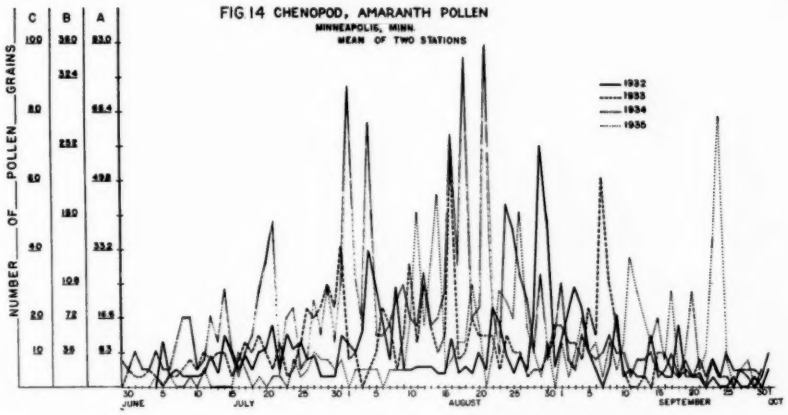
In number of cases in which it is involved, this group very definitely ranks first. Common and widespread members of this group include Common (short) Ragweed (*Ambrosia artemisiifolia* or *A. elatior*), Giant Ragweed (*A. trifida*), Western Ragweed (*A. psilostachya*), Marsh Elder (*Iva xanthifolia*), and Cocklebur (*Xanthium canadense*). Maps presenting the distribution of these throughout the state of Minnesota have been published in previous communications.[10,11] From August 10 to September 25 the air is predominantly occupied by pollen of this group. Pollen grains have been caught on the slides as early as July 2 (1935), but no sizeable count occurs until August 10. It is worthy of note that August 15, in general, represents the first day on which a pollen concentration of over 100 grains per sq. cm. of surface is attained. This fact appears to be significantly correlated with the incidence of first marked hay fever symptoms by so many ragweed sensitive cases. A concentration of between 100 and 200 grains may be thought of as something like a threshold value. It must be added, however, that since most ragweed cases are also sensitive to at least one other group,[8,10,24] the atmospheric concentrations of other groups must be considered in making a detailed analysis of symptoms. For example, August 15 also represents a period of comparatively high pollen production for the Chenopod group and consequently

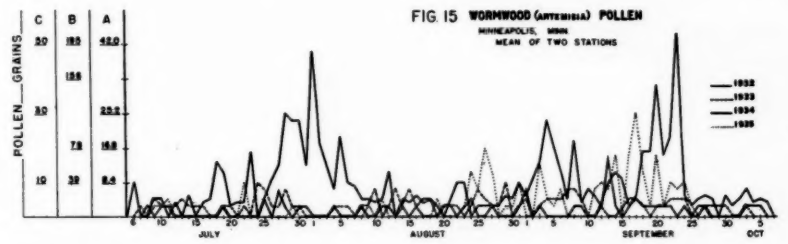


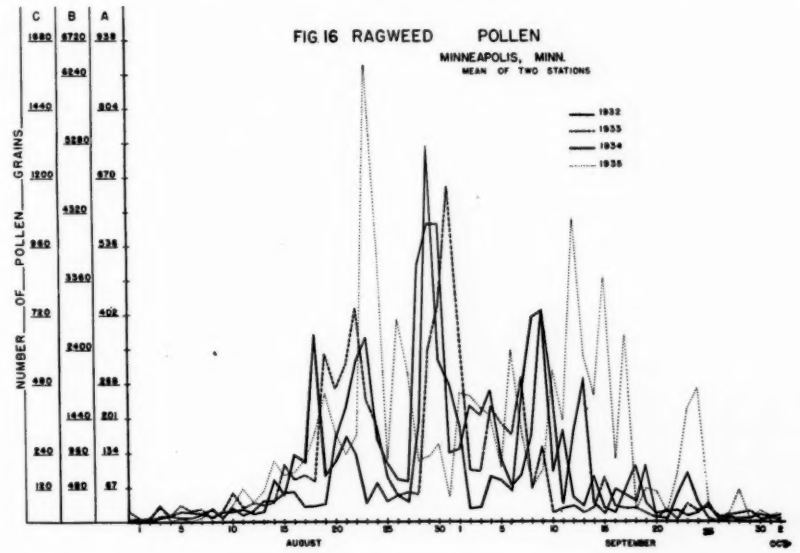
severe symptoms on this date could well be due to one or the other, or both groups. Data of the first three years on this survey have demonstrated the occurrence of three distinct critically high peaks of pollen production. The first of these, representing a concentration of approximately 378 pollen grains per square centimeter, has occurred as follows: August 18 in 1934, August 22 in 1933, and August 23 in 1932 (Fig. 16). The maximum pollen production of the season represents the second of these peaks (with an average count of 650 grains exclusive of 1935 data). For the first three years of the survey this concentration has been consistently noted between the 29th and 31st of August. The third marked peak (averaging 364 grains and thus quite similar to the first peak) has occurred on the 7th and 9th of September during the three years.

The data for 1935 indicate somewhat different conditions. High temperatures served, in general, to accelerate pollen production. On August 14 the concentration was 116 pollen grains per square centimeter, while the highest twenty-four-hour mean pollen count ever recorded in this survey (883 grains, mean of the two stations) was noted on August 23. As has been already noted, the maxima for other years occurred about one week later than this (August 29, 31). The days during the latter part of August and the first part of September were cool, and consequently the pollen count was rather low. However, strikingly high concentrations were again attained on September 6 (the period of the third peak of pollen production of the other years), and on September 12 the pollen count was way out of proportion to any experienced this late in the season. For the latter date a maximum con-

centration of 275 grains might have been suggested, but actually the count was 587 grains. In addition, unusually high concentrations were experienced on the 15th, 17th, and 24th days of this month. The last peak (258 grains) is of further etiologic interest since it came on the same day that the Chenopod group showed its maximum pollen production (Figs. 14 and 16). The attainment of critical concentrations by more than a single group during the same twenty-four-hour period is obviously an important fact where multiple sensitivity (commonly the case) is involved.



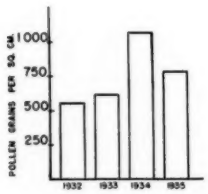




Group 17.—Miscellaneous Group

A varied assemblage of air-borne particles can be grouped under this heading. Among those consistently present are pollen grains of Pine (*Pinus Strobus, P. resinosa, P. Banksiana,* and

FIG 17 CHENOPOD POLLEN
AUGUST - SEPTEMBER TOTAL
MINNEAPOLIS, MINN.



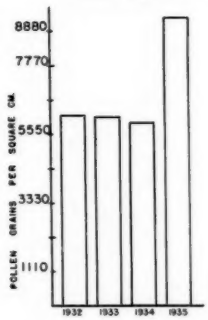
occasionally *P. montana, P. sylvestris,* and *P. nigra*) and Basswood (*Tilia americana*).

While pine pollen is most abundant during the latter part of May (average monthly total, 296 pollen grains), it is only slightly less so during June, whose average monthly total is 243. Greatest seasonal production of pollen was seen in 1933, when the annual total (820 pollen grains) was 35 per cent in excess of the average yearly total (607). The maximum twenty-four-hour count of 190 pollen grains per sq. cm. occurred during this year on May 30. It is of interest to note that occasional or "relic" pollen grains have been observed during every month of the year except January. Furthermore, the incidence of pine pollen grains could be, in many instances, related to severe atmospheric disturbances, especially with those that involved the descent of upper strata of air. Pine pollen grains, which possess bladdery "wings," are quite buoyant, and Scheppegrell[21] has noted them on slides exposed 17,000 feet above the earth during September. The relationship of pine pollen and hay fever appears to be very slight indeed for sensitivity to this group has been rarely if at all noted. Pollen of various kinds of Juniper (Cedar), which plants belong in the allied Cypress Family (*Cupressaceæ*), have been involved in some cases on record.[2] Very occasional grains of Juniper were noted during May of the last three years of this survey. Sporadic pollen grains of Fir (*Abies*), Spruce (*Picea*) and Tamarack (*Larix*), which are members of the Pine Family (*Pinaceæ*), also occurred on the slides.

While basswood or linden (*Tilia*) is insect-pollinated, it possesses flowers which are favorably placed for the introduction of pollen into the air currents. It is fairly abundant, both as native and cultivated trees, and should be considered as a possible though minor factor in sensitivity. While the pollen count has never been high (maximum twenty-four-hour count—31 pollen grains), it should be noted that it occurs during a time when the total pollen content of the atmosphere is comparatively low.

During the period June 23 to 30, the unexpected occurrence of a few pollen grains of the Mustard Family (*Brassicaceæ*) was noted. The grains were of two sizes (27 μ, 37 μ), the small-

FIG 18 RAGWEED POLLEN
AUGUST - SEPTEMBER TOTAL
MINNEAPOLIS, MINN.



er of which agreed with those of Tumble Mustard (*Sisymbrium altissimum*); the larger being those of common mustard (*Brassica nigra*). Investigation of patches of these common weeds demonstrated that very small quantities of pollen could be carried away from the opened flowers by strong air currents. This incidence, along with that of occasional Hop (*Humulus*), Grape (*Vitis*), Sumac (*Rhus*), Apple (*Malus*), Plum (*Prunus*), Sunflower (*Helianthus*), Aster, and unidentified *Compositæ* pollen grains, can only serve to point out some of the possible kinds of pollen which occasionally get into the air currents (Fig. 13). Hockey and Harrison[14] observed apple pollen on slides placed at a distance of 135 feet from the trees. Since these pollens have not been consistently noted as being in the air, they would appear to be of only occasional clinical importance.

Discussion

The importance from a clinical standpoint of the data presented is obvious. Before a specific pollen or antigenic group of pollens can be con-

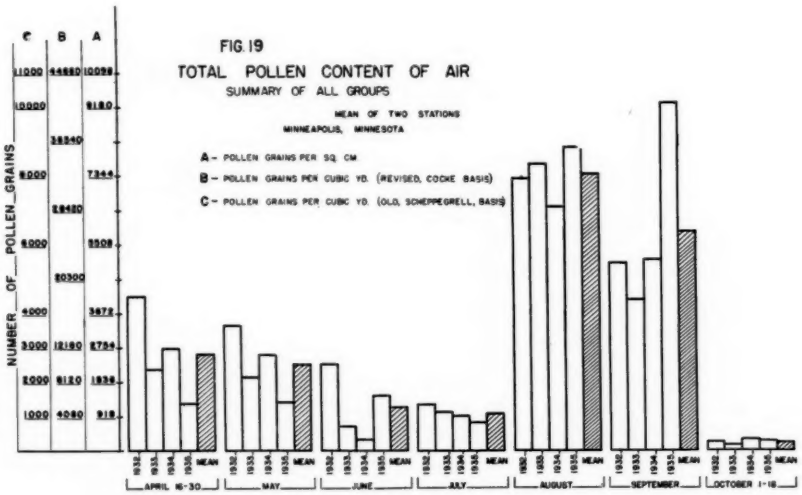
sidered to have significance even as a potential cause of hay fever (or asthma) for an individual or a group of patients, it must be established that the pollen in question is a pollutant of the atmosphere during the period when symptoms are complained of. The importance of a careful history as to period of symptoms is also apparent. A positive skin reaction has no diagnostic significance except it be shown that the pollen which induced it pollutes the atmosphere coincident with the period of symptoms of the patient. The discrepancy between skin sensitivity and clinical sensitivity is wide. It is notably greater in connection with some antigenic groups than with others, but is quite significant in all. The importance of recognizing the limitations of the skin test will be apparent from a study of Table III. This analysis of 936 consecutive cases of our own shows the number and percentage of patients reacting by skin test to each group, the number and percentage of the total who are clinically sensitive, and the percentage of those with positive skin tests who are clinically sensitive. For example, 425 (45 per cent) of the total (936 cases) exhibited positive skin tests to the Maple group, while only forty-five (4.8 per cent) of the total cases are clinically sensitive. In the case of the ragweed group (No. 16) the correlation between skin sensitivity and clinical sensitivity is higher and yet the difference is significant. Eight hundred and thirty-five (89 per cent) of the 936 cases gave positive skin tests to ragweed, but only 776 (83 per cent) of the total had symptoms during the August to frost period. Ninety-three per cent of those with positive skin test to this group of pollens are clinically sensitive. On the basis of the skin test alone the diagnosis would have been incorrect in fifty-nine (7 per cent) cases. The need for accurate data in regard to atmospheric pollution with which the period of symptoms may be correlated is obvious. The data herein presented supplies this need.

Concerning the exact amount of pollen which is clinically significant, no absolute values can be stated. It is important to recognize that this varies with different patients, dependent upon the degree of clinical sensitivity. For example, one patient sensitive to ragweed may regularly exhibit symptoms in the last few days of July, when the quantity of ragweed pollen in the air is slight, while a second does not show symptoms until August 15 or later, when the amount of pollution is large. However, the patient clinically sensitive to a given species or antigenic group will exhibit symptoms during the period of greatest atmospheric concentration and when correlation to this extent does not exist, he must be considered as *not* clinically sensitive to the pollen in question, regardless of the fact that the skin test may be positive.

If the sixteen groups are arranged first, in order of number of cases in which they are involved, and, secondly, in order of their pollen production, it is noted that seven out of the ten most important groups from a clinical standpoint also rank among the ten most abundant pollen producers. It would appear that the total amount of irritative substance to which the patient is exposed is an important factor which enters into the problem. However, perfect agreement between number of cases and total amount of pollen is not to be expected, for such factors as potency of the pollen and duration and time of blossoming season are, in all probability, also involved.

It is reasonable to suppose that the maximum number of pollen units given in successful treatment during one season may not be specifically adjusted to conditions prevailing the next season, especially where such abnormally high peaks occur as they did on August 23, September 12, and September 24, in 1935. A maximum dosage, for example, which has given complete protection during a season in which the highest daily pollen count was 800 pollen grains per square centimeter may not be adequate for a season during which a count of 1,224 occurs. It is for this reason that in Table II the highest individual (not mean) daily count is given for each Group. These figures, together with the date of highest pollen count, serve to measure and point out in a general way the most critical period for those patients who are sensitive to the Group. Obviously, maximum dosage in treatment should be attained before this period. The dates given as covering the duration of the pollination season do not indicate the period during which pollen is present in the atmosphere for any one year, but rather mark the possible limits of the pollinating season as evidenced from this survey. The yearly total pollen production for each Group is also given in Table II, since it is indicative of a seasonal variability which possesses clinical importance, as has been already suggested. Such climatic fac-

tors as rainfall, temperature, and wind are naturally concerned with the presence of pollen in the air, and variation of these will be reflected in the pollen curves (Fig. 19). For example, decreases in pollen concentration, which are striking when seen in graphic form, may be directly correlated with rainfall.



A rise or fall of temperature may be respectively associated with an increase or decrease in pollen concentration. This relationship appears to be related to the fact that temperature is concerned with the progress of cellular activity[22] and thus with the actual production and release of pollen. Further, variable convection currents, which are related to various temperatures, are apparently important in the rise and fall of pollen grains, and thus with their incidence on the slides. It is of interest to note that Markow and Spain[14] have noted a suggestive relationship between daily symptoms and temperatures. A correlation analysis[7,19] of the data for 1932 demonstrated that highest correlation between the daily pollen count and daily temperature was seen at times during which temperature is essentially a limiting factor, i.e., during April, May, September and October (mean $r = 0.602$). During these periods daily wind velocity was not significantly related to the daily pollen counts (mean $r = 0.162$).

Throughout the text, reference has been made to pollen counts obviously related to wind direction and velocity. Winds are especially concerned with the movements of masses of pollen from one area to another. Elm pollen grains were observed on slides exposed during mid-March (March 14-20, 1933), which is just a month in advance of their normal period of incidence in this region. Their presence can be related to a period of strong, south winds. At this time Elms were pollinating in the vicinity of Chicago, which would suggest that these pollen grains had been carried a distance of approximately 300 miles (Fig. 3).

Additional evidence may be cited for the widespread dispersal of pollen. Chenopod pollen grains as well as spores of Alternaria and Puccinia were caught on slides exposed aboard a boat traveling from Duluth, Minnesota, to Ft. William, Ontario. Likewise, during this same period (August 17 to 20, 1934), slides exposed at Isle Royal, Michigan, showed very occasional grains of grass, chenopod, ragweed, pine, fir, and alder pollen. Perhaps of greatest interest in this connection is Erdtman's[13] notation of a wide variety of pollen grains midway between Iceland and Ireland. He observed pollen representing such families as birch, pine, poplar, oak, willow, basswood, nettle, chenopod, mustard, sedge, heath, and grass. Stakman, et al[23] have observed that spores and pollen grains are relatively abundant up to a height of 11,000 feet.

A series of slides exposed from August 12 to September 4, 1934, on an island in Poplar Lake are of interest since, excepting for eight days during which there was a southwest wind, no ragweed pollen was found. Poplar Lake is north of Lake Superior (Grand Marais, Cook County,

Minnesota) and ragweed does not occur in the region. On days during which ragweed and chenopod pollen occurred on the slides exposed at Poplar Lake, high pollen concentrations of these groups were also observed at stations located further south, in Duluth, Moorhead, Minneapolis, and Montevideo. Strong southerly winds would come from regions richly supplied with ragweed pollen (cf maps[11]) and would thus serve to spread pollen-laden air beyond the limits of actual plant distribution. Similarly, winds would function in carrying pollen into regions where the plants were no longer actively pollinating, thus prolonging the troublesome season.

Summary

1. Pollen data based upon the study of atmospheric slides, exposed daily for four consecutive seasons in Minneapolis, Minnesota, are summarized under seventeen generalized group headings.

2. In certain of these groups uniformity of seasonal behavior has been noted, whereas in others marked variability has been seen. The clinical importance of this fact is obvious.

3. Important clinical aspects of these data which have been considered include:

a. The kinds of pollen present in the atmosphere for the entire growing season.
b. The time when a specific kind of pollen first appears in the air.
c. The period during which clinically significant concentrations exist.
d. The period of most critical (highest) concentration.
e. The time at which a pollen is no longer a factor in the atmosphere.
f. The fallacy of conclusions as to clinical sensitivity when based on skin sensitivity alone.
g. The importance of correlating the period of symptoms with data in regard to atmospheric pollution.

4. It is concluded from a brief review of existing methods of calculation that at present it is desirable to utilize the unit area basis for expressing pollen concentration.

Literature Cited

1. Airy, H.: Microscopical examination of air. Nature, 9:439, 1874.
2. Black, J. H.: Cedar hay fever. Jour. Allergy, 1:71-73, 1930.
3. Black, J. H., and Durham, O. C.: Elm pollen as a complicating factor in hay fever. Jour. Allergy, 1:501-505, 1930.
4. Coca, A. F., Walzer, M., and Thommen, A. A.: Asthma and Hay Fever in Theory and Practice. Springfield, Ill., C. C. Thomas, 1931.
5. Cocke, E. C.: Calculating pollen concentration of the air. Jour. Allergy. 8:601-606,1937.
6. Cocke, E. C.: A method for determining pollen concentration of the air. Jour. Allergy, 9:428-463, 1938.
7. Dahl, A. Orville: A study in air analysis in relation to hay fever pollen in Minneapolis. Thesis (M.S.) Univ. Minn., 33 pp., 1933.
8. Ellis, R. V.: Results obtained in treatment of hay fever with pollen extracts. Minn. Med., 19:507-510, 1936.
9. Ellis, R. V., and Rosendahl, C. O.: Fall hay fever in the upper Mississippi valley with special reference to Minnesota and the Dakotas. Jour. Lancet, 52:369-373, 1932.
10. Ellis, R. V., and Rosendahl, C. O.: A survey of the causes of hay fever for the State of Minnesota. Minn. Med., 16: 379-389, 1933.
11. Ellis, R. V., and Rosendahl, C. O.: The diagnosis and treatment of hay fever with especial reference to Minnesota. Minn. Med., 17:378-392, 1934.
12. Ellis, R. V.: Seasonal pollinosis. Staff Bull. Univ. of Minn. Hosp., 10:293, 311, (Mar. 17) 1939.
13. Erdtman, G.: Pollen grains recovered from the atmosphere over the Atlantic. Meddelanden Göteborgs Bot. Trädgard, 12:185-196, 1937.
14. Hockey, J. F., and Harrison, K. A.: Apple pollen may be wind-borne. Iowa State Hort. Soc. Rpt., 65:248-250, 1930.
15. Markow, H., and Spain, W. C.: Ragweed hay fever, its diagnosis and treatment. Jour. Allergy, 1:414-428, 1930.
16. Patterson, P. M., and Gay, L. N.: The pollen content of the air and its relation to hay fever in Baltimore, Md., during 1930. Jour. Allergy, 3:282, 1932.
17. Robinson, B. L., and Fernald, M. L.: Gray's new Manual of Botany. Seventh ed. New York: American Book Co., 1908.
18. Rosendahl, C. O.: A survey of the hay-fever plants of Minnesota. (Unpublished).
19. Rosendahl, C. O., and Dahl, A. O.: Rhythm in blossoming with special reference to hay fever. Program and papers, Minn. Acad. Sci., 7-15, 1936.
20. Scheppegrell, W.: Hay fever and hay-fever pollens. Arch. Int. Med., 19:959-980, 1917.
21. Scheppegrell, W.: Hay fever pollens in the upper air. Med. Jour. and Rec., 121:660, 1925.
22. Sharp, L. W.: Introduction to Cytology. 3rd ed. p. 111. New York: McGraw-Hill, 1934.
23. Stakman, E. C., Henry, A. W., Curran, G. C., and Christopher, W. N.: Spores in the upper air. Jour. Agric. Res., 24:599-605, 1923.
24. Sweetser, H. B.: Multiple sensitivity in hay fever. Minn. Med., 19:510-511, 1936.
25. Wodehouse, R. P.: Pollen Grains. New York: McGraw-Hill, 1935.

MANAGEMENT OF TETANUS WITH REPORT OF USE OF HYPERTHERMIA IN ONE CASE*

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IT IS a tribute to the medical and surgical practice of today that the incidence of tetanus has been so materially decreased by prophylactic procedures, such as the proper care of wounds and administration of prophylactic antitoxins. The widespread occurrence of the Clostridium tetani in black dirt, garden mold, manure and putrefying liquids, as well as in the excrement of horses and man, indicates that the prevention of tetanus by elimination of its bacterial source is impractical. Therefore, the problem of tetanus must be dealt with from the standpoint of prophylaxis and treatment in those cases in which the infection breaks through even the most favorable prophylactic policy.

The efficacy of strict prophylaxis is demonstrated by the number of cases of tetanus among soldiers of the United States in the World War:[4] a ratio of 0.16 cases per 1,000 cases of injury in battle—actually only thirty-six cases associated with 223,067 cases of injury. This rigid form of prophylaxis cannot be followed in civil practice, nor is it altogether desirable even if it were possible. The incidence of serum sickness and the possibility of anaphylactic shock are features which occasionally may place the overly cautious physician in an unfavorable light with some of his patients because of the discomfort of the serum reaction as well as the expense of the serum. As with any other procedure, intelligent discrimination must be employed, based on reliable histories and competent evaluation of the injury. Whenever any doubt exists regarding either the history or the wound, prophylactic measures are indicated.

The advent of alum-precipitated tetanus toxoid gives sufficient promise both in protection and ease of administration to warrant its trial and probable acceptance in a military crisis. However, for civilian practice except in especially exposed occupations, it is practically impossible to put into effect such extensive prophylaxis against tetanus that the necessity for perfecting the technic of treatment would be obviated.

I wish to mention one particular point in regard to the administration of tetanus antitoxin for prophylaxis. It has long been held that narcosis would confer protection from anaphylactic shock in administering serum to a previously sensitized individual. Not infrequently a patient will be brought into a doctor's office with numerous injuries suffered in an automobile accident. Frequently, the repair will be so extensive as to require narcosis, probably by ether inhalation. The finishing touch often will be the administration of 1,500 units of tetanus antitoxin. In a recent publication[11] it was pointed out that although ether narcosis substantially reduced the percentage of deaths from anaphylaxis in previously sensitized animals, yet a mortality of 23 per cent existed. This mortality indicates the risk associated with indiscriminate administration of antitoxin when given without skin tests or conjunctival tests to determine the individual's sensitivity. It is possible that the mortality would not be as high in man under the same conditions. Since we do know that it does occur, this danger can easily be avoided by the usual skin test or conjunctival test that is employed for the conscious patient.

Mortality from tetanus is sufficiently high to justify the universal fear regarding the onset of symptoms. Generally speaking, once the symptoms set in, the die is cast. Improved symptomatic treatment and the use of antitoxin, of course, have improved mortality figures somewhat but it is rather startling to note the results in 642 cases reviewed by Huntington, Thompson and Gordon[9] in 1937, for the purpose of evaluating results of use of antitoxin. In a control group of seventy-two cases in which no antitoxin had been given the mortality was 65 per cent. The remaining 570 cases were divided into five groups according to the amount of intravenous and intraspinal antitoxin which had been given. In these groups, the mortality ranged from 58.6 to 66 per cent. In each of these cases, antitoxin had been given within twelve hours after the patient's admission to the hospital, so it may be said that this was given

*From the Section on Neurology, The Mayo Clinic, Rochester, Minnesota. Read at the seventy-first annual meeting of the Wabasha County Medical Society, Lake City, Minnesota, October 5, 1939.

as early if not earlier than antitoxin usually is administered. The comparison of the mortality in this group with that of the control group tends to support the idea that once the symptoms have set in, the odds are against cure with the present therapeutic methods.

Prognosis

Prognosis in tetanus depends on the length of the period of incubation, the rapidity of progression of symptoms once they have begun and the location of the initial infection.

In the aforementioned 642 cases, it was noted that for all cases in which the period of incubation between the initial injury and the onset of symptoms was less than seven days, mortality was 76 per cent; when the period of incubation was from eight to fourteen days, mortality was 64 per cent; when it was from fifteen to twenty-one days mortality was 40 per cent. These mortality figures were entirely without relation to the amount of antitoxin which had been administered, but since the mortality for the group in which the antitoxin was used was so similar to that for the group in which it was not used, this grouping in terms of period of incubation is probably valid from the standpoint of prognosis. The rapidity of progression of symptoms once they have become evident presents the same prognostic significance as may be noted in any infectious disease in which fulminating and subacute or chronic types may occur. In regard to prognostic importance of the location of the injury, it may simply be said that since there often appears to be a local tetanus in addition to the general reaction, an additional complication may result if the injury occurs in a critical place, such as the head, by reason of the greater accessibility to the central nervous system.

Limitations of Antitoxin in Treatment

There is a danger in medicine of placing too much faith and dependence in specific remedies with too little regard for the conditions of administration. This has been true of tetanus antitoxin and it has taken many years to learn that it is not the unqualified specific that was hoped when it was first introduced.

In the review by Huntington and his co-workers, the best results were obtained in cases in which less than 10,000 units of tetanus antitoxin were given. In this group also the antitoxin was given intravenously and none was given intraspinally. It would appear from these studies that huge amounts of antitoxin and its intraspinal administration are contraindicated. However, it is reasonable to suppose that the patients who received smaller amounts of antitoxin were the ones who had less serious symptoms and, as we know from experience, had the best opportunity of recovering with symptomatic treatment alone. Very slight if any advantage could be noted from the use of intraspinal administration of the antitoxin. Studies by Abel and associates[2] which refute the blood cerebrospinal barrier idea give adequate evidence of the futility of intraspinal injection. The remarkable value of tetanus antitoxin as a prophylactic agent is too firmly fixed in our experience, however, to allow us precipitately to discontinue the use of antitoxin as a therapeutic agent. Studies by Abel and his coworkers within the past few years indicate that tetanus antitoxin plays a lifesaving rôle in treatment if it can be given early enough. If there is any one cardinal rule which should be brought before the general practitioner, it would be to give an adequate amount of tetanus antitoxin at the first sign, symptom, or, I should say, as soon as he sees a patient with symptoms.

Arbitrarily, one may say that there is little need in giving more than 100,000 units in any circumstances. This at the current cost of tetanus antitoxin amounts to $35, certainly not prohibitive from the economic standpoint. Cables[5] reported the case of a patient who recovered from tetanus after being given a total of 3,460,000 units of tetanus antitoxin over a period of forty-one days. The rationale behind this is highly questionable from the economic as well as the serotherapeutic standpoint. The cost of antitoxin alone in this case at the current price would be $1,200. In addition to this the patient received each day a total of 24 c.c. of 25 per cent solution of magnesium sulfate intramuscularly for a period of twenty-five days in 2 c.c. doses. I am sure that this played a substantial, if not the major, rôle in the control and eventual recovery of this patient by effecting symptomatic relief from the muscle spasm.

Merkert[12] in an able review of the ten years' experience with tetanus in two Minneapolis hospitals concluded that there was no value in heroic doses of tetanus antitoxin.

Pathogenesis

It has long been assumed that tetanus toxin has been produced at the site of the injury after sufficient period of incubation and from there would attack the nerve trunk traveling proximally to the central nervous system, from whence the toxin would be disseminated to adjacent motor nerve cells and result in a generalized reaction. In addition to this hypothesis, there was the hypothesis that the blood-cerebrospinal barrier prohibited the larger molecule of the antitoxin from reaching the smaller molecule of the toxin which has already combined with the nervous tissues. In other words, the only effect that antitoxin could have in intravenous administration would be to neutralize the freely circulating toxin present in the blood. Hence, intraspinal administration has been entertained by many in the hope of reaching affected areas more easily in spite of lack of supportive evidence that this was true, and in spite of the difficulties attendant to such procedures.

During the past five or six years, a series of interesting studies have been performed by Abel[2] and his associates in regard to this particular question. By a number of substantial experiments they support their argument that tetanus toxin is blood-borne and that the action is essentially central. This was postulated by Robertson[13] in 1916, when he concluded on the basis of his observations and his objections to current theories that the toxins pass throughout the body exclusively by the blood and lymph streams. Harvey,[8] in 1939, emphasized the fact that muscle rigidity depends on the integrity of the motor nerve endings in the muscle, and therefore tetanus toxin exerts a peripheral action also and not simply action on the central nervous system.

The studies of Abel and his associates offer experimental evidence that the toxin is blood-borne and a blood-cerebrospinal barrier does not actually obstruct the action of antitoxin. From some of their experiments,[3] with dogs, there is evidence that the antitoxin actually does attack and neutralize toxin which has supposedly been "fixed" in the nervous tissue. As might be supposed, the time element or the period of "fixation" is of primary importance in effecting a favorable antitoxin attack on the toxin.[1]

By an ingenious method of bleeding and subsequent infusion of dogs who had been infected with a liberal dose of tetanus toxin, Abel and his associates were able to recover more than 50 per cent of the toxin about ten hours after the injection of the toxin. By definite assay of the blood at this time, it could be learned that a very small, practically negligible, amount of toxin still remained freely circulating. Other dogs in the series which were given about 65,000 units of tetanus antitoxin at this time recovered without symptoms. The dogs which were not given antitoxin died from fulminating tetanus within seventy-two hours. Therefore, it was assumed that the antitoxin must have attacked the so-called fixed toxin of the nerve tissue, thus proving, first, the efficacy of antitoxin if given within sufficient time (in these cases ten hours from the injection of the toxin), secondly, that it could penetrate the so-called blood-cerebrospinal barrier since the antitoxin was given intravenously and the toxin in the blood had been washed out. This, of course, cannot be directly applied clinically since the controlled injection of toxin is a far different problem than the accidental introduction, into a wound, of tetanus spores from which the toxin has yet to be formed. These experiments give us a new hope that antitoxin may reach both the circulating and so-called fixed toxin and under proper conditions, chemical, physical, or both, a more effective neutralizing action may result. Obviously, these are extremely important facts since they open up the field of research for methods of attacking the toxin fixed in the tissue through some mediating or catalytic agency even though a considerable period has elapsed since the onset of symptoms. From the practical standpoint, prophylaxis is satisfactory and our chief concern must lie with the management of those patients who have full-blown symptoms when first seen, which, as has been already stated, is at a time when "the die is cast." There is practically no way of determining, when the patient is first seen with definite symptoms, whether his nervous tissues have a lethal or a less than lethal dose. In other words, our therapy consists more or less of routine control of symptoms plus the injection of tetanus antitoxin, the therapeutic efficacy of which we have reason to doubt on the basis of statistics I have mentioned.

The following case is offered as an example of employing a physical (thermal) agent in addition to the immunologic agent (antitoxin). So far as is known, this is the first case to be re-

ported in which artificial fever therapy has been employed in any capacity in the treatment of tetanus. No great claims are made for this method; it is presented for the speculation it may incite as well as to record the management and a good therapeutic result in an always to be feared disease.

Report of Case

The patient, a married farmer aged thirty-one years, was in good health until May 23, 1939, when he stepped on a nail and sustained a deep puncture wound in the ball of the left foot to which he paid no particular attention at the time. May 29, he felt rather sleepy, yawned most of the day and May 30, the seventh day after the injury, he complained of stiffness in his jaw. At this time, he was given 1,500 units of tetanus antitoxin, but the symptoms continued to progress and two days later, June 1, he was referred to the clinic and was admitted to the hospital.

At this time, stiffness of the jaw was graded 2 on a grading basis of 1 to 4; there was a partial risus sardonicus. Rigidity of the muscles of the neck grade 2 to 3 and grade 3 of the muscles of the abdomen and back, and definite opisthotonos were present. The puncture wound in the left foot was explored but no inflammatory reaction was demonstrated. However, a small foreign body was found and sent for culture which later demonstrated green-producing streptococci and some Gram-negative bacilli which were not identified. Within two hours after admission to the hospital, the patient was given 40,000 units of tetanus antitoxin intravenously, and four hours later another 40,000 units. The patient had been tested initially for sensitivity and demonstrated no reaction to serum. This same day another 20,000 units was given intramuscularly. One and one-half grain (0.1 gm.) of pentobarbital sodium was administered every two hours as an antispasmodic. This was supplemented by 1/6 to ¼ grain (0.01 to 0.016 gm.) of morphine sulfate when necessary to control the pain. No improvement was noted and the next day the patient was given an additional 80,000 units of tetanus antitoxin, making a total of 180,000 units, all of which had been given intravenously or intramuscularly. During this second day in the hospital, calcium gluconate was given intravenously in at attempt to obtain some relaxation of the skeletal muscles, but no objective improvement was noted.

By this time the patient's condition had progressed to the point of acute, continual pain and inability to swallow; alternate doses of 1½ grain (0.1 gm.) of pentobarbital sodium and ¼ grain (0.016 gm.) of morphine were given at least every two hours. On this date, urinalysis revealed nothing abnormal with the exception of occasional pus cells; the concentration of hemoglobin was 15.5 gm. per 100 c.c. of blood and there were 4,810,000 erythrocytes and 7,400 leukocytes per cubic millimeter of blood.

Because of the patient's critical condition, Dr. Woltman suggested the use of hyperpyrexia in the hope of increasing the neutralizing effect of the antitoxin on the toxin. With the use of a general anesthetic (chloroform) Dufour and co-workers[6,7] had noted that the efficacy of tetanus antitoxin administered intraspinally seemed to be increased. It was later advocated that ether be used as an alternate for chloroform, and although neither method gave conclusive results, each warranted consideration. Supposedly, the chemical effect of the general anesthetic was beneficial in effecting more complete toxin-antitoxin neutralization. This suggested that an empirical method, physical rather than chemical, might be used in the hope of producing some beneficial catalyzing effect through the agent of fever therapy.

Under the direction of Dr. Krusen and his associates in the Section of Physical Medicine, with special supervision by Dr. C. J. McLoughlin, the patient was given four hours of artificial fever produced by physical means, with a systemic temperature ranging between 105° and 106° F. He tolerated the fever treatment very well after the first hour and it had the definite effect of relaxing his muscles. He was given 1,000 c.c. of a solution of 5 per cent glucose in saline intravenously, in addition to about 800 c.c. of water which he took quite easily by mouth. Following the treatment his condition returned to its prefever status of muscular spasm in about two hours and he was put on a regimen of 1½ grains (0.1 gm.) of pentobarbital sodium every two hours with ⅓ grain (0.02 gm.) of pantopon as a supplement. The next morning he had had three stools in which gross blood was demonstrated but it was decided to go ahead with the fever treatment, keeping a careful watch on him for evidence of shock. Three and a half hours of fever at a temperature of 105° F. was given. The treatment was borne as well as on the previous day and with comparable relief during the session. That evening, however, it was necessary to give the patient 2½ grains (0.162 gm.) of pentobarbital sodium intravenously to put him to sleep. By the third day, a definite improvement was noted although he still had considerable pain and sedatives and hypnotics were necessary to treat these symptoms. Because of the beneficial effect of relaxation from the fever, he was placed in a pack at the end of the session of artificial fever and allowed to cool off over a period of four or five hours. This practice was continued from the second treatment throughout the rest of the course.

The stools grossly appeared normal within two days after the first evidence of gross blood on June 3. Results of benzidine tests on stools were positive for three weeks longer but results of tests with guaiac were negative, which indicated control of serious bleeding. Fortunately, no other symptoms developed to indicate a surgical abdomen. The patient was given a total of twelve sessions of fever, each of which was tolerated progressively better. These were given at approximately two-day intervals and he received the last fever treatment June 23, 1939. During this period, his fluid intake was kept up very well, largely by administration during the fever treatment, at which time he was

able to drink with comfort. Subjective improvement kept pace with objective improvement. Throughout this entire period, urine was not abnormal except for a trace of albumin, the value for hemoglobin did not go below 15.8 gm., the erythrocyte count was normal and the leukocyte count ranged from 7,400 to 10,900. Administration of pantopon was discontinued from the eleventh day in hospital and the dose of pentobarbital was decreased to about 7½ grains (0.482 gm.) per day. June 27, the twenty-fifth day in hospital, the patient was discharged as essentially recovered, with a minimum of spasms. He returned to the clinic, July 5, with a minor complaint of some epigastric and abdominal pain. Roentgenologic examination of the stomach and esophagus was performed with negative results. An examination of the stools at this time for occult blood also gave negative results. He was given practical suggestions for diet and reassurance and sent home.

The patient returned again on July 25, 1939, with some complaint of sternal pain which had the earmarks of anxiety symptoms. These were cleared remarkably when the patient was reassured that his five-year-old daughter who had stepped on a nail about a week previous had been adequately protected with a prophylactic dose of 1,500 units of tetanus antitoxin. The patient was seen on one other occasion early in August, at which time he subjectively admitted complete recovery.

Comment

Numerous avenues of thought are opened when evaluation of this technic is attempted. On the face of this report, it borders on absurdity to make conclusions on a single case but it may be reasonable to point out a few inferences that may be drawn.

In the first place, this method must rest for the present on its merits as a means of symptomatic control of the painful spasms of tetanus which contribute, through exhaustion, the greatest problem and danger of this infection.

Relief from the terrifying spasms, even at the cost of any discomfort of the heat therapy was welcomed by the patient and throughout the entire course the patient was able to be more coöperative on smaller amounts of hypnotics than is usually experienced. In addition to these benefits, the more coöperative attitude of the patient is believed largely attributable to his relative freedom from fear and panic during the sessions of fever. The increased metabolic rate is passively achieved; that is, with minimal demands on the body. Although I hesitate to speculate on the detailed workings, it is not impossible to postulate a more effective interrelationship of the toxin and antitoxin facilitated by the hyperthermia. For the present, however, the symptomatic relief obtained is sufficient to warrant further trial of this method. There was no doubt of this patient's improvement by the third day of treatment, whereas the clinical course before initiation of hyperthermia was definitely downward. Prognostically, however, this case was borderline in terms of period of incubation and rapidity with which symptoms progressed. Also the initial injury was in the least dangerous location. Certainly, this emphasizes the need of a number of cases properly to evaluate the rôle of hyperthermia in tetanus, but in this case the evidence is in favor of its value.

Some rather intriguing ideas may be offered as to the modus operandi, such as mobilization of resistive forces and rendering the tissues, containing the toxin, more permeable, permitting increased toxin-antitoxin combination and consequent neutralization. Still another theory is that the heat may produce some of its benefits through other agents. In this regard, it is interesting to note that vitamin C (ascorbic acid) has power to inactivate tetanus toxin in vitro.[10] Furthermore, one notes that values of ascorbic acid in blood are unusually low with fever resulting from infection, as well as low in urinary excretion during this period. In other words, in an infection the ascorbic acid demand must be greater and the destruction greater either owing to fever, the infectious agent or both. Kligler and his associates[13] stated that vitamin C (ascorbic acid) combines with the toxin in tetanus cultures and both are destroyed, resulting in depletion of vitamin C content of blood and detoxification of the tetanus toxin. This detoxification varies with temperature, time and concentration of the broth but as a rule is more efficacious at the higher temperatures (well within the point of thermolability of vitamin C, of course). The value of ascorbic acid in prophylaxis against current infections has been recently emphasized by Smith.[14] It does not appear to be borrowing too much to postulate some integral relationship among these factors such as the fever serving to speed up an ascorbic acid reaction of detoxification of the tetanus infection.

A comment would appear to be in order to explain the melena which occurred the second day of the treatment and persisted for a few days. The vitamin C level in the blood is usually about 0.5 mg. per 100 c.c. (normal 1.5 mg. per

100 c.c.) when the temperature rises to 103° F. It is possible that higher temperatures might depress this level even further and bring it close to the level at which hemorrhage may occur. Melena on this basis may have been corrected as the patient's intake of food increased after the third day, at least enough to hold a minimal level and avoid further hemorrhage.

Unfortunately, these speculations were not made until after the patient had recovered and his case was reviewed, so no estimations of the concentration of ascorbic acid were made. These clinical determinations, a procedure that can be effected with a minimum of effort, must be obtained in future cases.

Melena is not a common complication of artificial hyperpyrexia. It has occurred in only one other case at the clinic to the extent of being an actual clinical consideration. This was in a case of undulant fever and the only factors common to these two cases were that both were infections and both were treated with hyperpyrexia.

Summary and Conclusions

Review of recent literature points to the inadequacy of tetanus antitoxin as a specific therapeutic measure in a full-blown case of tetanus unless early administration of moderate amounts of the serum is possible. Large amounts of serum and its intraspinal administration appear to be contraindicated.

Management of symptoms is still of primary importance in the treatment of tetanus. The relief from muscular spasm during the period of elevated body temperature, the lessened danger of a complicating toxic reaction by reason of smaller sedative requirement, and the coöperative emotional reaction largely owing to lessened fear and panic—all of these may be considered as benefits directly related to the hyperpyrexia.

The possible relationship of ascorbic acid and hyperpyrexia to tetanus toxin is offered as a matter for speculation. Clinical studies will be conducted with a view to proving or disproving this relationship.

References

1. Abel, J. J., and Chalian, W.: Researches on tetanus: at what point in course of tetanus does antitetanic serum fail to save life? Bull. Johns Hopkins Hosp., 62:610-633, (June) 1938.
2. Abel, J. J., Hampil, B., and Jonas, A. F., Jr.: Researches on tetanus. III. Further experiments to prove that tetanus toxin is not carried in peripheral nerves to the central nervous system. Bull. Johns Hopkins Hosp., 56:317-336, (June) 1935.
3. Abel, J. J., Hampil, B., Jonas, A. F., Jr., and Chalian, W.: Researches on tetanus: time required for fixation of fatal quantity of tetanus toxin; return passage of toxin by way of lymphatic capillaries to cardiovascular system; return passage as basis of method for approximate determination of volume of lymph in closed lymphatic system. Bull. Johns Hopkins Hosp., 62:522-563, (May) 1938.
4. Ashhurst, A. P. C.: Report on tetanus. Arch. Surg., 1: 407-427, (Nov.) 1920.
5. Cables, H. A.: The amount of antitoxin used in a case of tetanus. Jour. A.M.A., 110:1271-1272, (Apr. 16) 1938.
6. Dufour, Henri and Duhamel: Tétanos guéir.—Chloroformisation et sérothérapie antitétanique. (1). Bull. et mém. Soc. méd. d. hôp. de Paris, 1:491-495, (Mar. 27) 1925.
7. Dufour, Henri and Mourrut; Deux nouveaux cas de tetanos rapidement guéris par injection intrarachidienne de sérum antitétanique au cours de la chloroformisation (1). Bull. et mém. Soc. méd. d. hôp. de Paris, 1:741-748, (June 7) 1929.
8. Harvey, A. M.: Peripheral actions of tetanus toxin. Jour. Physiol., 96:348-365, (Aug. 14) 1939.
9. Huntington, R. W., Jr., Thompson, W. R., and Gordon, H. H.: Treatment of tetanus with antitoxin: analysis of outcome in 642 cases. Ann. Surg., 105:93-96, (Jan.) 1937.
10. Kligler, I. J., Guggenheim, and Warburg, F. M.: Influence of ascorbic acid on growth and toxin production of Cl. tetani and on detoxication of tetanus toxin. Jour. Path. and Bact., 46:619-629, (May) 1938.
11. Koontz, A. R., and Shackelford, R. T.: Does ether narcosis protect from anaphylactic shock? Bull. Johns Hopkins Hosp., 64:125-146, (Feb.) 1939.
12. Merkert, C. E.: Tetanus: a study with analysis and report of thirty-three cases. Minnesota Med., 18:613-623, (Sept.) 1935.
13. Robertson, H. E.: The distribution of tetanus toxin in the body. Am. Jour. Med. Soc., 152:31-48, (July) 1916.
14. Smith, Sybil L.: Human requirements of vitamin C. Jour. A.M.A., 111:1753-1764, (Nov. 5) 1938.

COMMUNICATED INSANITY

An Instance of Folie à Cinq

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COMMUNICATED or induced psychosis *(folie à deux)* has been defined as "a mental disorder occurring in two or more predisposed individuals who have been intimately associated with each other, the predominating feature being delusions, particularly of a paranoid type, which are transferred from one to the other patient."[1] This condition was first described accurately by Lasègue and Falret in 1877. They used the term *folie à deux* to designate it although the condition had been mentioned previously by Berlyn in 1819, Ideler in 1838, Hoffbauer in 1846 and by Baillarger and others.[1]

Stoddart stated that for such a condition to

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develop, the patients should have many interests in common, view life from similar standpoints, and should have isolated themselves from the outside world. Accordingly, the condition is most common among persons living secluded lives, and the usual subjects of the condition are parent and sibling, two or more siblings, husband and wife, or friends of the same sex who live together closely. According to Hays,[7] it seems necessary that the individual (inductor) who is the originator of the set of ideas be a person of striking personality or of unusual mental attainments; at least, a person who is able to convince others of the validity of his beliefs. The inductor usually is considered to be an authority by the person (receptor) who accepts his ideas. The receptor must have an inherent willingness to receive the suggested or observed psychotic pattern. Craig pointed out: "that a man believes the statements of his insane relative to be true does not constitute insanity; but if he not only believes them, but acts upon the belief and regulates his life and conduct accordingly, then he too, must be adjudged to be of unsound mind." According to Bleuler, the inductor and receptor coöperate in morbid reactions to the outer world (such as querulousness, cursing, or violence) or they withdraw together, restricting contact with the world to a minimum.

Communicated insanity usually occurs as *folie à deux*, but instances of *folie à trois, quatre,* and *cinq* have been reported. Brussel, in reviewing the literature from 1900 to 1937, found that during this period forty-six papers had appeared on the subject, with a total of fifty-eight reports of cases. There were two instances of *folie à trois,* one of *folie à quatre,* and one of *folie à cinq.*

Tuke pointed out that we have no good corresponding English term for *folie à deux,* and that the term "communicated insanity" does not include those cases in which the disorder is not, strictly speaking, communicated, and which the French do include in *folie à deux.* The four varieties of *folie à deux* usually described[1,3,6,7] are as follows:

1. *Folie imposée* (Lasègue and Falret[3]) consists of a mental disorder in which one psychotic person imposes his delusional convictions on a sane individual who is, intellectually and morally, a weaker person. It has been said that if the pair is separated, the receptor tends to discard the beliefs of the stronger personality (the inductor).

2. *Folie simultanée* (Regis[3]) is characterized by the simultaneous appearance of a delusion, by reciprocal influence, in predisposed associated individuals.

3. *Folie communiquée* (Marandon de Montwel[3]) is the condition in which the receptor accepts the delusional ideas of the inductor only after prolonged resistance, and in which psychosis persists even after the patients have been separated.

4. *Folie induite* (Lehmann[3]) consists of the addition of new delusions to an existing psychosis as a result of association with other patients.

Grover pointed out that in the opinion of some writers, the classification of *folie à deux* into different forms is confusing and unnecessary. According to Stoddart the simultaneous occurrence of insanity in two members of the same family as a mere coincidence does not necessarily constitute an instance of *folie à deux;* Stoddart believed that it is essential that the mental disorder of one patient be directly caused by the persuasive influence of the other.

TABLE I. FIVE PATIENTS IN ONE FAMILY OF SEVEN ADMITTED TO HOSPITAL FOR *folie à cinq,* DATES AND AGES AT ADMISSION

Patient	Birth, date	First admission to hospital	Age on admission, years
Mother	12-27-1883	5-18-1933	50
Daughter	6-13-1913	9-17-1936	23
Daughter	2- 6-1915	5- 6-1937	22
Son	2-20-1917	5-21-1937	20
Daughter	2-24-1919	5-21-1937	19

Report of Cases

This report concerns a family of seven, in five of whom psychosis has developed. The patients were admitted to the Rochester (Minnesota) State Hospital. The parents were born in Czechoslovakia, but the five children (three daughters and two sons) were born in the U. S. A. The mother, the three daughters, and one son have become psychotic, participating in *folie à cinq.* For the orientation of the reader, the dates are given in Table I.

Case 1.—The mother apparently always had been suspicious of her husband and his association with

other women, and for several years prior to her admission to the hospital she had refused to see her few friends, believing that they really came to see her husband and not her. In March, 1933, she began to accuse her neighbors of "wickedness," to distrust her family, and to express her "hate" for her husband and for women in general. She would allow no one to enter her home. Her strange conduct progressed, so that by May, 1933 (time of admission to the hospital), she thought she was receiving messages from God and that she could feel the presence of God inside her body. She returned to her home in November, 1933, against the advice of physicians. On September 1, 1934, she was returned to the hospital with the information that she exerted a strange influence over her three daughters, in that they were entertaining the same ideas as their mother possessed. When someone came to their house, the four of them (mother and three daughters) would run upstairs so as not to be influenced by the visitor's "wickedness." The husband could do nothing with the daughters because the mother had firmly convinced them that he was wicked. She constantly warned the daughters against the father's supposed sexual advances and accused him of infidelity. She thought that at night the father would take two women to bed with him in addition to herself. She was returned to the hospital when it was found that because of her strong will and accusations, the girls remained in the house all the time, refusing to see anyone or to talk to their father. In the hospital she constantly said, "Only God and I are right and the rest of the world is bad." The condition of this patient slowly deteriorated and on September 27, 1935, she was transferred to another hospital for custodial care.

Case 2.—Daughter C, in 1933, became obviously suspicious of her father and antagonistic toward him. She soon began to voice the belief that he had been unfaithful to the mother and to accuse him of making sexual advances toward her. Her symptoms progressed so that by the time of her admission to the hospital (September 17, 1936), she thought her food was poisoned, spent her days in bed, going out only after dark, and said she saw "spirits." The social service report had said of her that "she talks in the same vein as the mother, as though memorized," and "patient dominates her two younger sisters." The situation had reached the point at which the girls refused to have anything to do with the father and stayed in their bedroom constantly. Daughter C was considered to be the "ringleader."

Case 3.—Daughter D always had appeared to be intelligent, capable, and more socially inclined than the other three siblings, in whom mental symptoms developed and who were of a shy, defensive nature. She had always loved her father and was in the habit of kissing him goodnight. In the early part of 1934, however, she ceased this practice, saying that her father only pretended to like her and that he never could be trusted. She became very sensitive and seclusive, adopting a defensive attitude. She slept with C and eventually shared C's beliefs and expressed the same fears regarding the father. She accused him of practicing witchcraft. The social service report had said of her that "she is most susceptible to suggestions." She heard voices, thought her mind was being influenced and her thoughts read, and that she was being watched constantly. She spent her days in bed, and if anyone called at the house, would hide under the bed. After C went to the hospital, D took her place as "ringleader." On D's admission to the hospital on May 6, 1937, she admitted that the father had never "touched" her but she knew "what he was thinking."

Case 4.—Daughter F, who had been shy and unhappy in grade school, visited an aunt in another town, where the girl seemed lively and apparently normal. On returning home, she again became asocial. In about 1935, she became stranger, left school, and joined her sisters in their asocial way of living and in their delusional ideas. She became so antagonistic toward the father that she had to be placed in a home for girls. She thought her father had poisoned her and that he had sexual designs on her. She said that she had been drugged so as to make sexual assault on her possible. By the time of her admission to the hospital (May 21, 1937) her behavior had come to resemble that of her sisters to a startling degree.

Case 5.—Son E became actively delusional in 1935 and 1936 but no doubt had shared the sisters' false ideas before that time. On admission to the hospital (May 21, 1937) he explained his commitment by saying that his father "had it in for him" and his sisters. He accused his father of being wicked and practicing witchcraft, and stated that ghosts under his father's direction would awaken him and the sisters at night by "tapping" on them. He said that daughter C had been the first sibling to notice that the father practiced witchcraft and that she had called the attention of the others to it. Often the children discussed the various observations each had made about the father, since one of them would watch his every move while he was at home. In these conferences his actions would be "interpreted" by them. Son E believed that his father wanted to control his thoughts and actions. Five months before admission to the hospital he saw his first "vision," in a mirror before which his father had just been standing. He was seclusive, evasive and extremely untidy.

Each of the four psychotic siblings and the mother were diagnosed as having the paranoid type of schizophrenia.

The father was a hard-working, sincere, bewildered, little man who could not understand why members of his family should be so strange. He worked in a coal yard as a common laborer. His family usually received aid from welfare agencies. He had a strong sense of loyalty and

for a long time had resisted suggestions that the daughters be sent to a mental hospital. But when they began to sleep all day and play the radio all night so that he was physically worn out, he finally consented to their commitment.

At the time of the mother's first admission to the hospital (1933), son G was ten years old. He was almost fourteen years of age in May, 1937, at which time he was the only sibling remaining at home with the father. He was described by the social service worker as being a bright, likable boy who did well in school and had numerous friends. He was a Boy Scout and a member of the school police. He was devoted to his father and they took great pride in their joint cooking and housekeeping. In November, 1939, we learned that he was "getting along fine at high school."

At the present writing (November, 1939), son E has been at home since November 7, 1937. He is working with the National Youth Administration, earning twenty dollars a month. Social service follow-up work reveals him to be at present agreeable, alert, and polite, apparently reacting favorably to his work and adjusting himself well at home. He is the "housekeeper" of the home shared by his father and brother and maintains it in a degree of neatness unusual in a home cared for by men only. When interviewed, he spoke very kindly of his father, which was in direct contrast to his previous attitude.

The mother and three daughters are still hospitalized. The mother has gradually deteriorated. The daughters have received both insulin and metrazol shock therapy and are somewhat improved in that they are more efficient with the ward work and are more tidy than they had been. However, they are still delusional and lack insight.

The important part played by suggestibility in the genesis of so-called communicated psychosis is mentioned by Henderson and Gillespie and by Grover. Brill[6] believed that an unconscious identification is at the basis of all instances of *folie à deux*. Grover's patients were suffering from schizophrenia and he stated: "The fact that schizophrenia may be precipitated by suggestion leads us to think that the relationship of schizophrenia to hysteria is closer than we have generally believed." Brill,[6] in discussing Grover's paper, pointed out that Kraepelin spoke of the close relationship between the two maladies and that hysterical reactions are invariably observed in the initial stages of schizophrenia. Jung, in his *Psychology of Dementia Præcox*, devoted a chapter to the parallelism between schizophrenia and hysteria (as concerns the disturbances of the emotions, characterologic abnormalities, intellectual disturbances, and stereotypy). Jung stated that in both hysteria and schizophrenia are found one or more complexes which become tenaciously fixed, but that between hysteria and schizophrenia there is no identity, but only a resemblance, of the psychologic mechanism. In schizophrenia these mechanisms reach much deeper. According to Grover schizophrenic psychosis produced by suggestion does not differ in symptoms or prognosis from that developing in the usual way.

Comment

The purpose of this presentation has been to call attention to the occurrence of communicated insanity and more specifically, to the occurrence of schizophrenia among five members of one family. On the basis of a study of these five patients, it is apparent that the psychosis each member had was similar, with identical delusional features. It would appear, as has been emphasized by other writers, that the psychosis was induced in the siblings by their unusually close contact with one another and also by the influence of the mother, who very early instilled in the children a dislike for, and fear of, the father. The youngest child, because of his age, did not come under this influence and has escaped any evidence of psychosis.

References

1. Amdur, M. K., and Ginsberg, S. T.: Folie à deux. M. Bull. Vet. Admin., 15:277-279, (Jan.) 1939.
2. Bleuler, Eugen: Textbook of psychiatry, translated by A. A. Brill. New York: Macmillan Co., 1924, 635 pp.
3. Boyd, W. A.: A contribution to the study of folie à deux. Med. Rec., 82:59-63, (July 13), 1912.
4. Brussel, J. A.: Folie à deux; review of the literature since 1900, and case reports. Psychiatric Quart., 12:331-340, (Apr.) 1938.
5. Craig, Maurice: Psychological medicine; a manual on mental disease for practitioners and students. Ed. 3, London: J. & A. Churchill, 1917, 484 pp.
6. Grover, M. M.: A study of cases of folie à deux. Am. Jour. Psychiat., 93:1045-1062, (Mar.) 1937.
7. Hays, R. R.: Folie à deux. Med. Rec., 148:104-105, (Aug. 3) 1938.
8. Henderson, D., and Gillespie, R.: A textbook of psychiatry for students and practitioners. Ed. 4, London: Oxford University Press, 1936, 606 pp.
9. Jung, C. G.: The Psychology of Dementia Præcox. Translated by A. A. Brill. New York: Nervous and Mental Disease Publishing Company, 1936, 150 pp.
10. Stoddart, W. H. B.: Mind and Its Disorders. Ed. 4. Philadelphia: P. Blakiston's Son & Co., 1922, 592 pp.
11. Tuke, D. H.: Folie à deux. Brain, 10:408-421, 1888.

THE MEDICAL AND SURGICAL TREATMENT OF PROSTATISM*

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DURING the past several years the treatment of prostatism has been discussed widely. A great deal has been said, alternately commendable and critical, about transurethral resection. Some physicians suggest that it is an operation devoid of all risk and that the procedure can be performed within a few minutes on any patient not yet bedridden with miraculous effect not only on vesical function but also on all other physiologic mechanisms resulting in fancy, if not in fact, in rejuvenation. Others, having tried transurethral resection, emphatically assert that there is no virtue in it and ardently champion perineal and suprapubic prostatectomy, sometimes with such fervor as to lead one to suspect that recent infrequent acquaintance with these open operations makes it difficult to recollect several obnoxious features that have been associated with such open operations in the past. The patient who has the advantage of consulting his levelheaded family physician is particularly fortunate because his needs can be sanely judged and perhaps, even though he has prostatism, treatment short of operation will bring relief. In the great majority of cases surgical measures are elective and are not emergency procedures. It seems worthwhile to review briefly, first, medical treatment, and, second, surgical alternatives.

Medical Treatment

A brief review of medical history indicates that obstruction to the vesical neck has been an affliction of man since time immemorial. The ancient physician first tried indirect methods of treatment. Drugs such as niter, asafetida, copper sulfate, camomile and aromatic oils were employed internally during the days of Hippocrates. Counterirritants applied in and near the genitalia were in vogue in the early part of the Eighteenth Century, according to Prout (1826) who employed plasters and hot fomentations to the perineum and rubbed the thighs with camphor or cantharides. Later, the attachment of leeches to the perineum or even the application of cautery to this portion of the body were methods which physicians used because they did not recognize the real offending organ. The use of hot sitz baths and of rectal lavage with ice water later gained favor.

As medical treatment improved, more or less direct methods of attacking the prostate gland were developed. Physick devised the method of hydraulic compression of the neck of the bladder by inserting into the urethra a distensible bag made of gut which he filled with water, hoping to force apart the offending structures which had occluded the urinary passages. Heine (1874) injected iodine and ergotine into the prostate gland, hoping to cause shrinkage in its volume which might have occurred in some instances as a result of the formation of infarcts which later became fibrotic and actually were the means of reducing the size of the gland.

Later, the use of catheters which emptied the urine from the bladder and which could be left inlying for varying periods came into vogue. Some of these because of their size and structure caused ulceration which possibly resulted in canalization and finally in some reduction of the diffuse congestion in the gland. At about this time, prostatic massage through the rectal wall, irrigations of the bladder and the instillation of soothing or irritant drugs into the posterior urethra began to be used. Dilatation of the urethra with various ingenious devices which were thought to compress or depress the prostate gland were final direct methods of treatment which stopped just short of being actual surgical procedures. That many of these methods of treatment were helpful cannot be denied although one questions the wisdom of employing some of them. Certainly it seems that extreme discomfort often resulted instead of relief.

Today there is no doubt that many patients are treated by variations of these somewhat antiquated methods. In some instances, benefit accrues especially when judgment is employed in the particular selection of a method of treatment for each case. For instance, it is undoubtedly true that prostatic massage may benefit the infected prostate gland which is but little enlarged. However, when calculi are present in the gland

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or when it is of the large, benign, so-called succulent type which ordinarily causes considerable retention of urine in the bladder, only false optimism would lead one to persist with treatment by massage. The use of a catheter either intermittently or inlying for the patient who is suffering with an acutely congested prostate gland sometimes is miraculously beneficial, symptoms often being ameliorated for relatively long periods.

The injection of sclerosing agents directly into the prostate gland as a rule will cause only further discomfort. The instillation of soothing or irritant media into the bladder or posterior portion of the urethra is done at the risk of inducing or increasing infection both local and systemic and should be avoided in most instances.

An agent which can now be used but which was not available to the physician of ancient times is the roentgen ray. In the case of a large, soft, nonmalignant prostate gland which is causing incomplete retention of urine and considerable perineal and rectal distress roentgen therapy may be helpful. I have seen a number of patients whose symptoms hardly demanded surgical treatment in which great comfort was obtained by appropriate roentgen therapy. That the patient who is suffering from cancer of the prostate gland may obtain great benefit from intelligent radiation therapy is known to almost everyone. However, if one is deluded by a hope of cure and if intense radiation therapy is given, in my experience only additional suffering will result.

In the last few years the subcutaneous injection of male hormones in concentrated form has been popularized. Diminution of nocturia, slightly more forceful urination and reduction in the amount of residual urine have occurred in several cases in which I have given treatment with these preparations. However, I have been unable to confirm the enthusiastic reports of those who first described these preparations. As a matter of fact, these preparations are rather expensive and are a poor substitute for other reliable methods. I believe that, occasionally, the use of testosterone propionate is warranted especially in the case of an extremely aged man whose principal symptom is nocturia. In several such cases, the results of treatment have seemed very much worth while.

It can be stated without much fear of contradiction that medical methods of treatment must be given serious consideration in any case of prostatism. Operations for this condition are never in the nature of an emergency. It is always desirable to reserve surgical treatment for those patients in whom nonsurgical methods have failed to effect worthwhile relief. So-called prophylactic operations done for early symptoms of prostatism cannot be condoned, and should be avoided. Great satisfaction to both physician and patient will result from adherence to the principle of deferring an operation of questionable necessity until the indications are definite.

Surgical Treatment

Ancient surgical remedies for patients afflicted with obstruction at the neck of the urinary bladder included attempts to pierce this region with long thorns, sharpened reeds and other similarly ingenious instruments which were passed into the urethra. These fell into the classification of direct methods of treatment and not long afterward, methods of ligating pedunculated portions of the prostate gland were devised. Guthrie and Civiale invented instruments with which to divide the bar at the neck of the bladder by sense of touch, there being no method then available for visualizing the region of the incision.

Surgeons then switched in the next few decades to indirect methods of attack on the prostate gland and resorted to castration (White), ligation of the vas deferens or vasectomy (Steinach) and even to ligation of both internal iliac arteries, hoping in this way to shut off the blood supply to the gland, thus causing it to become atrophic. The mortality rate from the latter procedure was frightfully high as might be expected.

What was said to be complete prostatectomy gradually came into practice at the turn of the century although incomplete prostatectomy was done through a perineal incision by Covillard as early as 1639 and by the suprapubic route, in 1832, by Amussat. Goodfellow, Fuller, Belfield, Young, Alexander and many others contributed to perfection of both the perineal and suprapubic operations. All of these authors stressed the thought that they were removing the entire prostate gland. Nevertheless, recurrences of obstruction were by no means rare and it was finally apparent that only the adenomatous tissue which lay within the true anatomical limits of the prostate gland was really enucleated by means of any of these operations. Since the bladder was inevitably opened, a period of urinary drainage

through the incision or through tubes placed within the bladder was unavoidable. Ideas of asepsis were rather sketchy or at least difficult to put in practice and much hit or miss effort was the rule in nursing attention. The great improvement in nursing methods and increased appreciation for the value of aseptic methods in the care of the bladder which accompanied the development of transurethral surgery have been infinitely valuable to the general surgeon.

Caulk, almost two decades ago, advanced the idea that relatively large amounts of prostatic tissue could be removed safely with a punch instrument. Before that time, Young had advocated the punch operation for median bar types of obstruction. Very few, if any, urologists could duplicate Caulk's results which he obtained by skill and persistence. His operations were done blindly and most surgeons felt unwilling or were not bold enough to follow his lead. Finally, a little more than a decade ago, technical advances in the fabrication of instruments resulted in the production of both lens and direct vision resectoscopes which made possible the visualization of the vesical neck during the entire course of operation. This started a revival of transurethral prostatic resection which, at the present writing, seems to have largely replaced other methods of prostatectomy.

In contrast with suprapubic prostatectomy, the performance of which is not difficult for the average surgeon, transurethral resection requires for its safe usage a long period of training during which time the surgeon must become able to recognize anatomic landmarks which are often distorted by various bizarre enlargements of the prostate gland. It is not enough to have dissected many cadavers or to have performed several hundred cystoscopies in the normal or nearly normal subject. Sufficient skill to perform safely a transurethral resection of the prostate gland can be acquired only at the expense of much thought, considerable eyestrain and tedious effort. It is an operation which the average general surgeon does not have sufficient patience to learn. Only a few will have the courage to master it in the face of all the handicaps which finally can be overcome by those fortunate enough to develop sufficient interest and opportunity.

Our experience at The Mayo Clinic with transurethral prostatic resection continues to be very favorable. Of chief interest to me is the fact that during the past decade we have been able to perform the operation successfully and safely on many hundreds of patients who were formerly denied restoration of vesical function. Those afflicted with urinary retention and at the same time with complicating factors which prevented suprapubic prostatectomy or even sometimes cystostomy have proved, almost without exception, to be safe candidates for transurethral resection. Advanced renal disease, severe cardiac disorder, extreme age and so forth no longer are contraindications to surgical removal of the obstructing portion of the prostate gland. It is well recognized that patients more than eighty years of age are not the best risks for operation but during the year 1939 alone, we performed transurethral prostatic resection on forty-five such patients.

Of secondary interest is the fact that the period of hospitalization for patients undergoing transurethral resection continues to be much shorter than that formerly required for prostatectomy. This is important to all of us and in particular to the patient and his family. During 1939, the large majority of 1,000 patients operated on spent less than one week in the hospital. This, of course, was possible only by virtue of the fact that there is no external wound; hence, the patient need be in bed only on the day of operation. Dr. C. H. Mayo once stated that like a foundered horse, if old patients once get down it is very difficult to get them up. Each year, I realize more and more the wisdom of his sage observation.

The relief of symptoms following transurethral prostatic resection is the third point of great interest. With very few exceptions, nocturia is practically eliminated, the urinary stream returns to full size and force and general health and vigor are strikingly improved. Pyuria continues in only a small minority of cases in which great deformity of the bladder has existed for many months or years prior to operation.

It is, of course, essential that the transurethral resection be thorough and be accomplished without damage to the urethra. Postoperative stricture of the urethra can be avoided by making the proper choice of instruments, by not grasping the penis during operation and by the use of catheters of reasonable size during convalescence. If the anterior portion of the urethra is very small the resectoscope can be passed through an incision made in the perineal portion which is always

of sufficient caliber to obviate the formation of stricture.

The fourth and perhaps most attractive feature about transurethral prostatic resection is the low mortality rate following operation. During 1939, of the 1,000 patients operated on, a total of nine patients died, a mortality rate of less than 1 per cent. This was in spite of the fact that we subjected to operation many who would have been denied any other type of prostatic surgery. This minimal death rate results principally from thorough preliminary study, which allows recognition of degenerative disease that may be a potential cause of postoperative complications; expeditious operative technic which includes the restriction of the scope of operation to only what is necessary, the proper choice of anesthetic agents and the use of supportive therapy on the operating table if the need arises; meticulous attention to postoperative nursing during the entire convalescence including care of the catheter, attention to regulation of the bowels, special care to avoid fecal impaction and finally of great importance, the will of the patient to get well, an intangible factor which I believe must be important, for with it some patients survive very adverse complications. Daily visits to encourage the patient are unquestionably beneficial.

Recurrence of urinary obstruction due to regrowth of adenomatous tissue has been observed following all types of prostatectomy in a small proportion of cases. It has long been recognized that carcinoma of the prostate gland may develop years after either perineal or suprapubic enucleation and such cases have been reported by several authorities. These facts indicate the futility of referring to any form of prostatectomy as a complete operation, for the anatomical prostate gland is always left behind as the so-called surgical capsule. That portion of the gland which is ordinarily enucleated when the suprapubic or perineal procedure is used, can be, if it is deemed necessary, just as thoroughly removed by the transurethral route. However, the decrease in mortality accompanying transurethral surgery may be partly owing to avoidance of complete prostatectomy in the decrepit individual. It is certainly true in my experience that prolonged transurethral operations increase morbidity and mortality. It seems justifiable, therefore, to use some judgment in each case and if it is deemed safer for the individual, the operation should be restricted and one should risk the reappearance of urinary obstruction. We have followed this principle in recent years and have no reason for regret. Some patients have returned after several years and have stated that obstruction to urination was again developing and almost without exception they have preferred another transurethral resection rather than enucleation. A few patients have suffered with hematuria occasionally; the bleeding arose from remnants of prostate gland left at the time of transurethral resection. This is, of course, a very disturbing symptom but it can be eliminated in almost every case by further resection.

It seems justifiable to conclude that the results of transurethral resection warrant its continuance in the future as the operative method of choice in any case of prostatism that requires surgical treatment.

Conclusions

1. Treatment for prostatism should be undertaken only after intelligent consideration of each individual case. This cannot be done by rule of thumb, or on the basis of wishful thinking.

2. Medical methods of treatment should always be tried if there is doubt concerning the necessity of surgical methods. Prophylactic operations done for very early symptoms are to be condemned.

3. When surgical treatment is definitely indicated the several methods available include suprapubic prostatectomy either in one or two stages, perineal prostatectomy and transurethral prostatic resection. Equally good functional results can be obtained by these several methods. However, the mortality rate of transurethral prostatectomy at the hands of an expert is much less than that of the other methods.

4. Judging from the history of the treatment of prostatism no surgical method which has failed to produce consistently good results survives.

5. Transurethral resection at expert hands is beyond any doubt the preferred surgical method of treatment for prostatism.

CASE REPORT

DISLOCATION OF THE HEAD OF THE FIBULA

Report of Two Cases

W. E. MACKLIN, M.D., C. M. HARTMANN, M.D., and H. O. PETERSON, M.D.
Minneapolis, Minnesota

TRAUMATIC dislocation of the proximal end of the normal fibula without any underlying pathology being present occurs rather infrequently. It is supposed to occur much more commonly in association with other conditions such as fractures of the leg, osteomyelitis, tumors, in amputation stumps and associated with disturbances in bone growth. A review of the literature indicates that about forty-nine cases have been reported of simple dislocation of the superior tibiofibular articulation. Lyle in 1925 collected thirty-nine cases from the literature and added two of his own. He is one of the few individuals to have seen and reported two of these cases. Since 1925 six cases have been reported by six authors and Speed refers to one case in his textbook on "Fractures and Dislocations" published in 1935. He discusses the condition in considerable detail referring largely to Lyle's paper. Christopher's "Minor Surgery" gives a brief but complete discussion. Key and Conwell's text mentions the subject rather briefly and refers to one case, and Wilson and Cochrane merely say the condition is very rare because of the anatomy of the superior tibio fibular joint, which protects it from most injuries. Other texts such as Scudder's, Böhler's, and Jones and Lovett's make no mention of this type of dislocation.

The superior tibio fibular articulation is a true joint with a joint capsule and synovial membrane which sometimes communicates posteriorly and superiorly with the knee joint. The fibula is rather firmly attached to the tibia by the joint capsule and the anterior and posterior tibio fibular ligaments, which are further supported by the fibular collateral ligament and the anterior and posterior divisions of the attachment of the biceps tendon. The head of the fibula is further protected by lying somewhat behind the lateral condyle of the tibia. These are the reasons which are given in Wilson and Cochrane's text to explain the infrequency of dislocation of this joint.

The dislocation may occur posteriorly or anteriorly or upward. The anterior dislocations must also be displaced laterally, since the head of the fibula lies behind the lateral condyle of the tibia. The upward dislocations are said to be extremely rare and always associated with injuries about the ankle joint. The anterior dislocations have been reported about twice as frequently as the posterior. Posterior dislocations are the most serious since the four cases of chronic dislocation and the two of peroneal nerve injury all were in this group.

Pain occurs immediately and is localized to the region of the head of the fibula. The pain is usually aggravated by motion of the knee joint and the head of the fibula is tender to pressure. The leg feels best with the knee slightly flexed. Usually the patient cannot walk. Anteroposterior and lateral roentgenograms show the displacement quite clearly but the diagnosis may be readily overlooked even on careful examination of the films if one has no previous knowledge of the condition. A few cases become chronic and these patients are said to complain of a feeling of weakness of the leg.

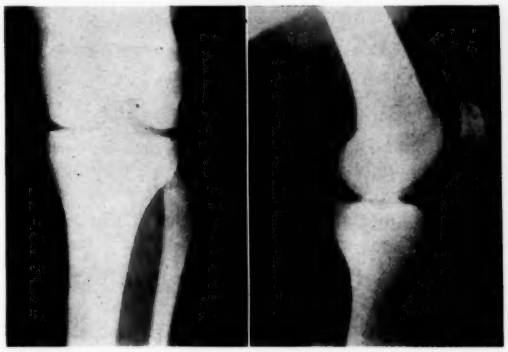

Fig. 1. In the anteroposterior projection the upper end of the fibula is seen to be situated lateral to the condyle of the tibia rather than posterior and lateral, which is normal. In the lateral view the head of the fibula lies too far anterior. The osteochondroma of the lower end of the femur on the medial side is an incidental finding.

The dislocation follows two general types of injuries. A fall on the inverted extended foot or with the leg doubled under the body is the most common type of injury. Less often the dislocation follows a direct blow on the head of the fibula. Occasionally as in one of our cases the injury is produced by a muscle pull initiated by a twisting motion.

Reduction is supposed to be accomplished quite readily by manual pressure directly on the displaced head. This should be done with the knee flexed to relax the biceps. General anesthesia has been necessary in some cases. One case reported by Small had to be pounded back with a mallet after all attempts at manipulation had failed. On the other hand what might be termed spontaneous reduction has been observed in fifteen cases. In many of the reported cases and in our two cases a loud, snapping sound was heard just as the re-

duction took place. Most authors advise fixation by a plaster cast for from four to six weeks. However, some of the cases have been completely free of symptoms from the time of reduction without any fixation. The head of the fibula may be pegged to the tibia, sutured to the tibia or an arthrodesis of the tibiofibular joint performed in cases of chronic dislocations. All of the cases requiring some type of open fixation were posterior dislocations. In this connection a case reported by Schoolfield is of considerable interest although it was not a traumatic dislocation. His patient was a seventeen-year-old boy who had bilateral relaxation of the superior tibiofibular articulation with pain in this region on the right side. The heads of the fibulæ could be readily moved about and roentgenograms showed

Fig. 2. After reduction the position of the upper end of the fibula is normal.

lateral separation of the right fibula from the tibia. An arthrodesis on the right resulted in complete relief of the pain.

The prognosis is excellent. Only two cases are reported with any serious sequelæ. These two cases developed a paralytic foot drop from injury to the peroneal nerve. These were also cases of posterior dislocations.

Case 1.—A sixteen-year-old boy reached upwards, backwards and to the right while standing with his feet firmly placed on the ground in order to catch a football. He felt a sudden pain in the right knee and on attempting to walk fell down. He noticed a lump on the outside of his knee. Examination a few minutes later by Dr. Macklin confirmed the presence of the lump which was due to the prominence of the laterally dislocated fibula. He was having severe pain and was unable to bear his weight on the right leg. The biceps tendon was unusually prominent and taut. There was localized tenderness over the head of the fibula. The x-rays before and after reduction are shown in Figures 1 and 2. The leg was flexed and the foot slightly inverted and direct pressure applied to the proximal end of the fibula from in front. This resulted in immediate reduction accompanied by a loud snapping sound. No anesthesia was required. A rubber sponge was applied over the fibula and held in place with an elastic bandage. The patient used crutches for three weeks keeping the knee slightly flexed. There have been no complaints referable to the knee in the past seven months following the reduction.

Case 2.—A young woman, aged eighteen, slipped on some ice and fell. She did not remember exactly how she struck the ground but she experienced immediately a severe pain in the right knee and was unable to bear any weight on this leg. She was examined about fifteen minutes later by Dr. Hartmann. The upper end of the fibula was unusually prominent, protruding anteriorly and laterally. Roentgenograms (Fig. 3) showed the

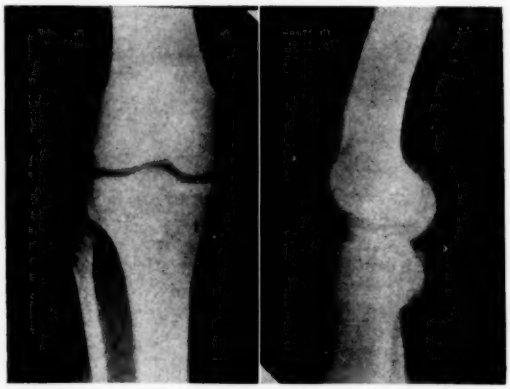

Fig. 3. Note again the extreme lateral and anterior position of the head of the fibula indicating a dislocation.

head of the fibula to be dislocated anteriorly and laterally without any fracture accompanying the displacement. The knee was flexed, the foot dorsi-flexed and pressure applied directly to the head of the fibula causing it to slip back into normal position. A loud snapping sound was heard as the reduction took place. A cast was applied for two weeks and an elastic bandage for three more weeks before weight bearing was allowed. The patient then began to walk without any support and has had no discomfort of any kind in the knee since.

Bibliography

1. Christopher, Frederich: Minor Surgery. Third edition. Philadelphia: Saunders, 1937.
2. Gaudlitz: Mitteilung über eine isolierte Luxation des Wadenbeinköpfchens am rechten Kniegelenk nach vorne. München Med. Wchnschr., 83:1589, (Sept.) 1936.
3. Hall, W. W.: Dislocation of the head of the fibula. U. S. Naval Medical Bull., 24:577, (July) 1926.
4. Hogenauer, F.: Ein Fall von Luxation der Fibula. Deutschr. Ztschr. f. Chir., 207:422, 1928.
5. Key, John A., and Conwell, H. Earle: Fractures, Dislocations and Sprains. St. Louis: C. V. Mosby Co., 1937, p. 1061.
6. Lempriere, L. R.: Self reduced dislocation of fibula. Brit. Med. Jour., 2:1136, (Dec.) 1928.
7. Lyle, Henry H. M.: Traumatic luxation of head of fibula. Ann. Surg., 82:653, (Oct.) 1925.
8. Schoolfield, B. L.: Case report of bilateral relaxation of the superior tibiofibular articulation. Jour. Bone and Joint Surg., 9:500, (July) 1927.
9. Small, W. D.: U. S. Naval Med. Bull., 33:264, (April) 1935.
10. Speed, Kellogg: Fractures and Dislocations. Philadelphia: Lea & Febiger, 1935, p. 905.
11. Straus, Fritz: Isolierte Verrenkung des Wadenbeinköpfchens nach vorneine typische Sportverletzung. Deutschr. Ztschr. f. Chir., 246:212, 1936.

HISTORY OF MEDICINE IN WINONA COUNTY

(Continued from August issue)

Biographies

Franklin Staples, M.D., was born in Raymond (now Casco), Cumberland County, Maine, on November 9, 1883. He received an academic education, then began the study of medicine in the office of Dr. Charles S. D. Fessenden of Portland, Maine, in 1855. He attended lectures at the medical department of Bowdoin College in 1856, and was one of the first students in the Portland School for Medical Instruction. During a period of four years, Dr. Staples was head instructor of the Old Center grammar school in Portland (since 1900, the Staples school). The year previous to his arrival in Winona, Dr. Staples spent at the College of Physicians and Surgeons in the City of New York, and, after graduating, became for a time an assistant in the Maine Medical School as demonstrator of anatomy. At the age of twenty-nine he established himself in Winona. During the first few years after his arrival he was a partner of Dr. J. D. Ford. He became well liked and highly respected in the community. Ford soon gave up practice and, in 1867, Dr. Staples formed a partnership with Dr. Wm. H. H. Richardson, a new arrival. Dr. Staples already held a leading position in his profession.

Aside from medical affairs, Dr. Staples had an interest in the religious and educational activities of the community. In 1883 he was elected superintendent of the First Congregational Sunday School and continued in that position until 1871. The school attained its highest attendance during the period of his leadership. He was also a member of the Board of Trustees and served on many of the active committees.

Dr. Staples' interest in educational affairs was manifested in his service as school director in Winona during the years 1877-1879. It is also of interest that he gave an address before the Teachers Institute as early as 1872 on the "Importance of Some Knowledge of Physiology and Chemistry as a Means of Preserving Health."

Dr. Staples was one of the founders of the Winona Preparatory Medical School, and was active as an instructor there. He was a member of the first Winona Medical Society and a charter member of the later organization of 1869. In the years 1874 and 1885, he served as president of the Winona County Medical Society. He was also a member of the State Medical Society and in 1871 became president of that organization. For many years he was a member of the State Board of Health, and held the position of president from 1889 until his death. He was elected to membership in the American Medical Association about 1870, and held offices as a member of the judicial council and as vice president. During the years 1883-1887 he held the chair of the practice of medicine in the medical department of the University of Minnesota, when the faculty of the University constituted

the medical examining board of the state. In 1883 he received an honorary degree from the Saint Louis College of Physicians and Surgeons.

Dr. Staples' writings on medical and surgical subjects were published in various scientific and professional journals. Among them are: "The Climate of the Northwest" in the *Northwestern Medical Journal* for August, 1871; his report on "The Influence of Climate on Pulmonary Diseases in Minnesota," published in the *Transactions of the American Medical Association* in 1876; and a series of published reports to the Minnesota State Medical Society included nearly every year from 1876 to 1885.

He was unusually prolific in his reports and essays. The records of the State Board of Health, of which he was a member from 1874 until 1901. contain interesting and varied reports by him in nearly every issue. Dr. Staples served also on the local Board of Health, starting in 1866 and continuing in that position for some time. During his entire professional career he was one of the most prominent physicians in Minnesota. His death occurred in 1901 in Winona.

John Steinbach was a well known ophthalmologist who practiced medicine at Winona for twenty-nine years, coming there in 1891. He died at his home in Winona, at the age of sixty-four years, on April 28, 1920.

Hiram Stevens was a Winona County physician about 1864.

Darwin Adelbert Stewart was born at Croyden, New Hampshire, on April 5, 1842. At the age of five years he was taken by his parents to Montpelier, Vermont, where he spent the days of his boyhood. After receiving the usual preparatory education, he entered Kimball Union College at Meriden, New Hampshire, and graduated in 1863. Soon afterward he visited the western part of Minnesota and "laid" two land warrants which his father had purchased from Revolutionary veterans. As the result of this trip, there was laid out the village of Stewart, in McLeod County. While in Minnesota, Mr. Stewart taught school in the village of Plainview in the winter of 1863-1864. He then returned East and entered the Eastman Business College at Poughkeepsie, New York. In the following year he became an instructor in a similar institution in New Haven, Connecticut. In 1867 he entered the medical department of Columbia University in the City of New York. Two years later he was graduated, and then took a year's course in the old New York Hospital, now known as the Roosevelt Hospital. Immediately upon the expiration of his term as an interne in this hospital, he came west and on January 1, 1870, selected Winona as his permanent location. He opened an office and soon built up a large practice. In 1871 he became a member of the Winona County Medical Society, and served as president in 1875. He was elected to membership in the Minnesota State Medical Society in 1872. For five years, from 1875 to 1879, he served as city physician. During the seventies he was also active as an instructor in the Winona Preparatory Medical School. He served for ten years as County Coroner; and later in life he held the office of president of the school board, and as mayor of Winona (1902-1903). Dr. Stewart was local physician for the Chicago, Milwaukee, and St. Paul railroad for more than thirty years, and for the Green Bay and Western railroad for nearly forty years. He was prominent in both the Elks and Masonic fraternities.

Dr. Stewart died at St. Barnabas Hospital in Minneapolis on November 30, 1914, at the age of sixty-nine.

T. Stringer was a physician and surgeon at Utica about 1878-1879.

Absalom Boyles Stuart, M.D., was born at Williamsburg, Pennsylvania, August 27, 1830. He attended Lewisburg University and received his degree of M.D. from the Berkshire Medical College in 1856. After receiving his degree, he began practice in West Hampton, Massachusetts. In 1858 he moved to Macomb, Illinois. In August, 1861, he was commissioned assistant surgeon of the Tenth Missouri Infantry, U.S.V., and was appointed superintendent, on behalf of the Federal Government, of the hospitals established at Iuka, Mississippi, by a cartel between General Rosecrans and General Price. In April, 1863, he was promoted to be surgeon of the First Alabama Cavalry (white), U.S.V. In January, 1864, he resigned from the army. In March, 1866, he graduated from Bellevue Hospital Medical College, and soon thereafter took up the practice of his profession in Winona. While engaged in general practice, he gave especial attention to surgery, and had charge of a number of notable cases. He was a member of the Massachusetts State Medical Association, a charter member of the Winona County Medical Society, and president of that organization in 1872. He was also a member of the Minnesota State Medical Society in 1870 and served as vice president in 1874 and 1876. In 1873 he was secretary of the State Medicine and Public Hygiene Section of the American Medical Association. He was instrumental in securing the establishment of the Minnesota State Board of Health in 1872. That year he was elected teacher of surgery in the Winona Preparatory Medical School, and in 1873 he became president of the institution. It is interesting to note that he served on a committee of the State Board of Health in 1872 to inquire into methods of teaching hygiene in the normal schools.

In 1876 Dr. Stuart was a delegate to the International Medical Congress at Philadelphia. Some of his more important professional publications were: Annual Report, Minnesota State Board of Health for 1873 and "Report of a Case of Supposed Separation of the Upper Epiphysis of the Radius," in the Transactions of the Minnesota State Medical Society, 1876.

About 1878, Dr. Stuart moved to Santa Barbara, California, where he practiced for a short time. After a few years, he moved to Santa Rosa, in the same state (1881), where he died on July 27, 1887.

Dr. Stuart was married in 1857 to Anabel, daughter of Hugh F. McGaughey, then of Doddsville, Illinois. She received her early medical education in the Woman's Medical College of Philadelphia, and graduated from the Medical College of the Pacific, San Francisco, in 1878. Mrs. Stuart practiced successfully for many years in Santa Rosa.

J. H. Sudduth, physician, surgeon, and druggist, came to Saint Charles about 1863. About 1869-1870 he and Dr. Slagle practiced as partners. From 1872 to 1876, approximately, Dr. Sudduth and Dr. Bibbins were partners in a drug business. In 1877 Dr. Sudduth took his brother, H. H. Sudduth, into the drug business with him. Dr. Sudduth probably practiced medicine at the same time. In 1878-1879 Sudduth and Boyd engaged in the drug business together. A notice of 1883 states that Dr. Sudduth had resumed the prac-

tice of medicine in Saint Charles. Dr. Sudduth died in Saint Charles, November 24, 1884, at the age of seventy-one.

T. J. Swan was listed as a Winona County doctor in 1865.

Jerome B. Tamblin, M.D., came to Winona in 1867 and published the following card upon his arrival.

JEROME B. TAMBLIN, M.D.
Physician and Surgeon
Recently of New York, has had twelve years' experience as a practitioner. Particular attention given to the treatment of diseases of women and children. Calls in city and country promptly attended to.—Office in Ford's New Brick Block, Second Street, Winona, Minn., Residence 159 3rd Street.

In 1869, Dr. Tamblin moved to Saint Charles to practice and to engage in the drug business with Dr. Guthrie. It was during that year that the Winona County Medical Society, of which he was a charter member, was organized. In 1871 he became a member of the State Medical Society. During the term of his practice in Saint Charles, Dr. Tamblin was often called out of town to attend cases at Elba, Utica, and the surrounding country. He was always an active politician in the county. In 1882 he moved to Lanesboro, Minnesota, and in 1885 he was living at Lincoln, Nebraska.

D. L. Taylor was listed as a Winona County doctor in 1865.

Rudolph C. Teschan graduated from the University of Basle and from the University of Michigan. Before coming to Winona in 1882, he had occupied the position of Inspector of the National Board of Health. He came to Winona from Detroit, Michigan, to succeed Dr. Lessing, who went to Philadelphia to spend the winter. In 1885 he became a member of the Winona County Medical Society and of the Minnesota State Medical Society. Aside from his practice, Dr. Teschan was vice president of the Winona "Adler" publishing company, organized in 1885.

J. Thomas was a doctor in Minnesota City in 1857.

J. Thompson, physician, lived at Rollingstone in 1860 and died there in 1861. Possibly he is confused with Dr. Thomas.

Isaac W. Timmons, homeopathic physician, came to Winona about 1875. About 1878 he moved to Chatfield, but returned to Winona to practice in October, 1884.

(To be continued in October issue)

President's Letter

CALL TO SERVICE

THE draft act may or may not be passed when this issue of MINNESOTA MEDICINE is off the press; but the ground work will have been laid, in any case for medical participation in draft board activities.

The contribution of medicine to the defense of the nation was never confined exclusively to service for the fighting men, of course. But the importance attached to physical fitness and to the careful selection of men for military services has grown to large scale proportions in this new effort to prepare our nation.

Proceeding from lessons learned in the last war, the draft boards of 1940—if they should indeed be set up—will require far more careful sifting of enrollees than ever before. And no time is being lost by physicians in Minnesota in providing, beforehand, the machinery that will be ready when Congress and the President say the word.

There will be 122 draft boards in Minnesota with three members on each board, officers of the association were informed at a recent conference. One examining physician will serve with each board and his rate of pay will be $1.00 an hour for each hour he is actually engaged in making physical examinations for the board but not to exceed $10.00 a day.

Plans call for thirteen medical advisory boards of specialists to whom draftees will be referred by these boards. These boards will be located in Minneapolis, St. Paul, Rochester, St. Cloud, Mankato, Willmar, Crookston, Bemidji and Duluth, and the members will serve without pay.

All appointees must have indicated their willingness to serve. They must be over thirty-one years of age and they must not be officers in the reserve.

Selection will be made from recommendations by presidents and secretaries of county medical societies and councilors of their respective districts.

Two or three names will be submitted for each position according to present plans and they will be submitted in turn to the Governor. Appointments will be made by the President from recommendations by the Governor.

The importance of securing well qualified physicians for these appointments goes without saying. Also the importance of speed in selecting them in case the draft is passed.

Here is another avenue of service for organized medicine, another chance for the Minnesota State Medical Association to show responsible state officials its effectiveness as an instrument of public service.

Instructions will be mailed to county officers immediately as they are received from the Governor and it is certainly not out of place, even in advance of action by the Congress, to urge promptness upon our society officials in answering that call.

B. S. ADAMS, President
Minnesota State Medical Association

EDITORIAL

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BUSINESS MANAGER
J. R. BRUCE

Volume 23 SEPTEMBER 1940 Number 9

SULFATHIAZOLE

THE chemical products sulfanilamide and sulfapyridine have proven to be phenomenally effective in various types of bacterial infections. Their use has been somewhat limited by their toxicity. To maintain proper dosage and avoid toxic effects, certain laboratory procedures, not always easily accessible, are necessary.

In an effort to maintain the very useful action of these products and at the same time reduce the risks, some new variants have been evolved. Sulfamethylthiazole and sulfamidathiazole have undergone extensive clinical trials, in various types of infections, to determine their usefulness, dosage and dangers. These trials have been carried on under the direction of the Federal Food and Drug Commission.

Sulfamethylthiazole has proved to be effective in the control of streptococcal, pneumococcal, and staphylococcal infections. However, in effective dosage it has also shown a tendency to cause toxic neuritis, of an extent and permanency not yet fully determined. Sulfathiazole, now released and on the market, has proved effective in the control of the same types of bacterial infections; and has shown a much lower toxicoty. Its rate of excretion appears to be rapid and much more uniform than that of sulfapyradine. It is eliminated principally through the intestinal tract, only about 33 per cent passing through the kidneys. Its necessary level of concentration in the blood for effective action is lower than that of either sulfanilamide or sulfapyradine.

It is tasteless and easy to handle, and has much less tendency to disturb digestion. It has not shown the tendency of sulfanilamide to cause cyanosis; nor the tendency of sulfapyradine to acetylate and disturb the kidneys. Apparently sulfathiazole is a much safer chemical to employ than sulfanilamide or sulfapyradine, and therefore can have a much wider use.

There is a class of patients partially disabled by chronic bacterial infections in whom it is highly desirable that some form of chemotherapy be used. In the last six months I have employed sulfathiazole in the treatment of a group of twenty-five such private patients. Long continued bacterial infections of the urinary tract proved suitable for the purpose of study, both because of the ambulatory nature of many of them, and because of the comparative ease of checking the effects of the drug.

The bacterial agent was found, and blood and urine cultures made before any drug was given. The blood level of the drug was determined in forty-eight hours, and cultures again made of the catheterized urine. Frequent blood counts were had and any untoward symptoms noted. When cultures became negative, the dosage was immediately reduced sharply, and continued laboratory and clinical evidence gathered.

The first cases were chronic kidney infections in which the agent was *Streptococcus fecalis.* Uniformally rapid and satisfactory control with

no undesirable side effects was attained in these urinary infections; and the drug was then applied in pneumococcal and staphylococcal infections. Again the result was favorable comparing well with previous experience with sulfanilamide and sulfapyradine.

From this experience I am able to predicate that the effective sulfathiazole level for bacteriostatic control of urinary infections with *Streptococcus fecalis* and *Bacillus coli* is an initial blood level of about 4 mg. per centum of blood. In adults this can be reached by a daily dose of 6 to 8 grams for forty-eight hours, followed by a maintenance dose of 3 to 4 grams for two or three days; and then dropped to 1 or 2 grams daily at which dosage the blood level is less than 1 mg. per centum.

In pneumococcal infection the blood level of sulfathiazole should be around 6 mg. per centum, and can be rapidly reached by a daily dosage of 8 to 10 grams. If, after this level is maintained twenty-four hours, clinical improvement is not evident, the type serum should be employed in moderate dosage. The drug should be reduced immediately to one-half the initial dosage, and further reduced to 1 to 2 grams per day when the temperature has returned to normal. Initial dosage for children under twenty-five kilos in weight should be based on 1.5 to 2 mg. of sulfathiazole per kilo.

Ample water should be provided with each dose of sulfathiazole; the tablets should be either well chewed or broken up before administration. The minimum daily dosage should be continued for a week or so after the acute symptoms have subsided.

Recurrences in both acute and chronic infections are common if the drug is stopped too soon, but the bacteriostatic action is maintained by dosage of 1 to 2 grams daily after the initial necessary blood level has been maintained for forty-eight hours.

With any drug of this chemical group there will be individuals who react badly. The dosage must therefore be as carefully controlled with sulfathiazole as with sulfanilamide or sulfapyradine. However, the present evidence is that sulfathiazole is an active bacteriostatic agent in a wide group of bacterial infections, and that it can be effectively employed with less chance of disturbance of the blood, kidneys, or the digestive system than occurs with sulfanilamide or sulfapyridine; and that its desirable action can be attained with blood levels much lower than either of them.

W. B. ROBERTS.

THE SULKOWITCH TEST FOR EXCRETION OF CALCIUM

THE medical profession is indebted to the group of workers in the Massachusetts General Hospital who have added so much to our knowledge of metabolism of calcium. It is this group which has taught us methods for the early diagnosis of hyperparathyroidism, thus permitting the early removal of hyperfunctioning parathyroid glands.[4] These workers also have performed detailed studies of cases of parathyroid insufficiency and have discussed the best methods for raising the concentration of calcium in the blood.[5] They have discussed the formation of renal stones[1] and have outlined a nonsurgical treatment for certain types of renal and vesical stones.[6] Moreover, they have described an entirely new syndrome, which is being referred to as "Albright's syndrome."[3]

One of the greatest contributions of this group has been to present to the medical profession a simple, effective and inexpensive method of observing excretion of calcium in the urine. The test can be performed by any physician, without the use of extensive or expensive laboratory facilities. The method consists simply in adding the reagent to an equal amount of urine. The reagent, named "the Sulkowitch reagent," is described in a brief article by Albright.[2] He stated, "The Sulkowitch reagent* is a solution containing oxalate radicols buffered at such a pH that when equal amounts of the reagent are added to urine the calcium will almost immediately come down as a fine white precipitate of calcium oxalate. If there is no precipitate there is no calcium, and the serum calcium level is probably from 5 to 7.5 mg. per hundred cubic centimeters. If there is a fine white cloud, there is a moderate amount of calcium and the level of calcium in the serum is in the satisfactory range. If the precipitate looks like milk, the danger of hypercalcemia is present."

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*"Two and five tenths Gm. of oxalic acid, 2.5 Gm. of ammonium oxalate and 5 c.c. of glacial acetic acid are dissolved in distilled water and made up to a volume of 150 c.c. (Barney, J. D., and Sulkowitch, H. W.: Progress in the Management of Urinary Calculi, Jour. Urol., 37:746, (June) 1937.)"

This test is valuable for determining excessive excretion of calcium in the urine in cases of hyperparathyroidism. It is of equal value in regulating the treatment of parathyroid insufficiency. In this connection Albright concluded by stating:

"The patient does his own tests and modifies the dose according to the results. I usually prescribe about 3 c.c. of dihydrotachysterol a day until calcium appears in the urine and then I drop the dosage to a maintenance level of about 1 c.c. from three to five times a week.

"This discussion has been slightly oversimplified. There are a few 'ifs' and 'buts' that must be added. Occasionally a normal person who happens to be on a very low calcium diet will show in a single specimen of urine practically no calcium. Almost any normal person shortly after drinking a large amount of milk will show an excess of calcium in the urine. Since one keeps one's patients with hypoparathyroidism on a high calcium diet, one would expect them always to show hypercalciuria if their levels of serum calcium are normal. It thus turns out that if the dosage is reduced when a large amount of calcium appears in the urine the blood calcium will be kept at a slightly subnormal level. Such is the case. This is probably all the better, since it further guards against hypercalcemia, and slight hypocalcemia is not deleterious."

References

1. Albright, Fuller: Some medical aspects of the renal stone problem. New England Jour. Med., 217:1063-1066, (Dec. 30) 1937.
2. Albright, Fuller: Note on the management of hypoparathyroidism with dihydrotachysterol. Jour. A.M.A., 112:2592-2593, (June 24) 1939.
3. Albright, Fuller, Scoville, Beecher and Sulkowitch, H. W.: Syndrome characterized by osteitis fibrosa disseminata, areas of pigmentation, and gonadal dysfunction. Endocrinology, 22:411-421, (Apr.) 1938.
4. Albright, F., Sulkowitch, H. W. and Bloomberg, E.: Hyperparathyroidism due to iodiopathic hypertrophy (hyperplasia?) of parathyroid tissue; follow-up report of 6 cases. Arch. Int. Med., 62:199-215, (Aug.) 1938.
5. Albright, Fuller, Sulkowitch, H. W. and Bloomberg, Esther: Comparison of the effects of vitamin D, dihydrotachysterol (A.T. 10) and parathyroid extract on the disordered metabolism of rickets. Jour. Clin. Investigation, 18:165-169, (Jan.) 1939.
6. Albright, Fuller, Sulkowitch, H. W. and Chute, Richard: Nonsurgical aspects of the kidney stone problem. Jour. A.M.A., 113:2049-2053, (Dec. 2) 1939.

—E. H. Rynearson.

THE FIRST CHOLECYSTECTOMY IN AMERICA

THE first successful cholecystectomy in Minnesota, in fact, the first in this country, was performed on September 24, 1886, at St. Joseph's Hospital, Saint Paul, Minnesota, by Dr. Justus Ohage. It seems that the anniversary of this important surgical milestone should not pass unnoticed.

Langenbuch, in 1882, was the first to remove successfully the human gallbladder. The cholecystectomy by Doctor Ohage was the twenty-second case reported in the medical literature. At that time cholecystotomy was considered to be the procedure of choice in disease of the gallbladder; Lawson Tait described cholecystectomy as being "intrinsically absurd." At that, cholecystotomy was not performed very frequently. Only eight years before, in June, 1878, the first successful cholecystotomy had been performed by Kocher. Up to 1886, there had been only fifty cases reported in the literature with thirty-nine recoveries and eleven deaths, a mortality of 22 per cent.

Doctor Ohage's patient was a white woman, thirty-five years old, who had had attacks of gallstone colic for three months. In the right hypochondriac region there was an oblong tumor that could be felt. It was freely movable and painful to touch and its lower pole reached almost to the iliac fossa. On the morning of the operation there was a feeling that something "daring" was to be performed. Certain physicians had warned Doctor Ohage that he might be indicted for manslaughter if the operation should fail. Doctor Ohage was assisted by Doctors Nelson, Schulin, Dedolp, Jr., Denny, and the house surgeon, Doctor Welsh. Ether anesthesia was used. The operation was performed under "strict antiseptic precautions, no spray." Doctor Ohage, like many surgeons of that period, believed more in antiseptic than aseptic surgery. The washing of the peritoneum and viscera with 1:2000 corrosive sublimate solution at the end of an operation was a common practice as well as the dusting of iodoform over the wound after closing the abdominal layers. Sisters Christina of St. Joseph's Hospital, who remembers the period well, says that surgeons upon closing the abdominal wound often applied a layer of borated or iodoform gauze on the skin and then a dressing of non-sterilized absorbent cotton. The use of the carbolic acid spray seemed to have enjoyed but brief popularity in Minnesota, and its use was on the wane at the time of this operation.

The incision was a vertical one, about six inches long, on the outer border of the right rectus muscle. Upon opening the peritoneal cavity, a hydrops of the gallbladder was found. There was a stone in the cystic duct which was manipulated back into the gallbladder. After the cystic duct was ligated with carbolized silk, the base of the gallbladder was incised and more than a pint of mucoserous fluid evacuated. The cystic duct was then cut close to the ligature with a cautery,

and the gallbladder removed. It contained one hundred and thirty-five stones. After washing the liver and the bowels with a 1:2000 corrosive sublimate solution, the whole wound was closed with deep and superficial silk sutures. Iodoform was dusted freely over the wound, a large pad of absorbent cotton applied and held in situ by a binder. It is interesting that no drainage tube was used.

The patient made an uneventful recovery. Her temperature never rose to over 101 degrees, nor her pulse over 90 beats per minute. A dose of calomel was given on the fifth day to relieve constipation. On the eighth day, the dressing was removed for the first time. There was no drainage on the dressing. All the sutures were removed. The patient was discharged from the hospital on the thirteenth day after operation. She remained well until her death nine years ago.

In his paper written in the *Medical News* for February 19, 1887, Doctor Ohage discussed somewhat his indications for cholecystotomy and cholecystectomy. "In old decrepit subjects where the disease (cholelithiasis) is probably ended, et cetera," "he favored cholecystotomy." In healthy young subjects where the stone formation is probably not yet ended, et cetera," he favored cholecystectomy. In later years, however, he extended his indications for cholecystectomy to even old subjects.

Those who knew Doctor Ohage best say that he was of a modest, self-effacing nature. In 1912, Dr. William Mayo asked Dr. J. Ohage, Jr., "Did you know that your father was the first to perform a cholecystectomy successfully in this country?" It was only after this that the senior doctor told his son about the operation. Probably very few know that Doctor Ohage ran away from home in Germany at the age of fourteen years, and came to this country. He fought with the Union Army during the Civil War. After several years as a sailor and working as a medical assistant on a railroad, he was graduated in 1880, from the University of Missouri Medical School at Columbia. His postgraduate work was obtained under Esmarch, Virchow, Bernard von Langenbeck and Keyes. Returning to this country he practiced in St. Paul, Minnesota, where he was known not only as a skilled surgeon, but also as an efficient health officer and lover of the out-of-doors. He continued in his practice until a year before his death in 1935.

The "first" operation or surgical procedure is often a matter of chance. However, the successful cholecystectomy performed by Doctor Ohage was not a matter of luck or chance, but was the result of a thorough surgical background. Minnesota has been fortunate in always having had good medical men like Doctor Ohage. His achievement adds luster to the medical history of this state.

CHARLES E. REA

DESOXYCORTICOSTERONE

The Council on Pharmacy and Chemistry reports that it has had under consideration for some time preparations of the adrenal cortex. When desoxycorticosterone was synthesized and marketed as an acetate for clinical use, it was anticipated that much of the inaccuracy and unreliability of adrenal cortex therapy associated with the use of extracts of the adrenal cortex gland would be eliminated, since the administration of this potent steroid on a basis of dosage by weight appeared to offer advantage over the administration of adrenal cortex extracts, which are rather unsatisfactorily assayed on laboratory animals. The early reports of dramatic clinical success in the treatment of Addison's disease were held most promising. Soon after desoxycorticosterone was employed in Addison's disease, the Council learned of the occurrence of significant untoward reactions and, in several cases, actual fatalities. One of the most striking effects obtained with this substance was hypertension, which in some cases resulted in cardiac failure and death. There has been sufficient confirmation of these results to warn against the indiscriminate and excessive use of this substance in routine therapy. Adequate evidence of another sort has also led to the conclusion that desoxycorticosterone acetate does not possess all the properties of the adrenal cortex gland and that the synthetic principle, therefore, does not furnish complete replacement therapy. In view of the possible widespread use of desoxycorticosterone acetate, the Council requested Dr. Edgar S. Gordon of the University of Wisconsin Medical School to prepare a review of the physiologic and clinical data obtained with this substance up to the present time. The Council authorized publication of Dr. Gordon's article "The Use of Desoxycorticosterone and Its Esters in the Treatment of Addison's Disease" and it appears as a part of the Council's report. (J.A.M.A., June 29, 1940, p. 2549.)

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association
W. F. Braasch, M.D., Chairman

DEFENSE RECORD FOR MINNESOTA

Minnesota ranks second among the eight states of the Seventh Army Corps Area in the number of medical preparedness questionnaires so far returned to the American Medical Association headquarters.

This record, as reported recently by Dr. R. W. Fouts of Omaha to Chairman F. L. Smith of Minnesota's Committee on Medical Preparedness, is regarded as highly satisfactory. Top rank now belongs to Nebraska, however, with South Dakota, North Dakota, Iowa, Kansas, Missouri and Arkansas following Minnesota in the order listed. The entire Corps Area is among the top five in the United States and the average is 11.3 per cent above the rest of the country.

Physicians of Minnesota are being congratullated by defense authorities upon the promptness and wholeheartedness of their coöperation, therefore, although a considerable number still remain to be heard from. The actual number of cards mailed to the State Office as evidence that the obligation has been fulfilled was 1667 when this issue went to press.

A special appeal is accordingly being made to the others by officers of the association as well as by the committee in charge to supply the information requested and to send their cards to state headquarters at once. Minnesota will not remain at its present position long unless all remaining questionnaires are returned.

In the new organization for defense the Surgeon General of the Army depends wholly upon American Medical Association lists to supply medical personnel for every branch of preparedness at home as well as in the field. It is the individual responsibility of each physician to supply information needed for those lists.

Additional copies of the questionnaire are available for those who may have mislaid them from the State Office at 493 Lowry Medical Arts Building, Saint Paul, or from Chairman F. L. Smith at Rochester.

INOPPORTUNE

The American Medical Association goes on trial on the charge of violating the Sherman anti-trust law on October 21 in Washington, D. C.

At the same moment, the government which, through one arm has brought a criminal indictment against the officers and two component units of the association, will through another arm be asking and receiving essential aid to the defense of the United States.

The organization and discipline which is regarded as criminal by the justice department will be thankfully and eagerly put to use by the War Department in the selection of the men who will serve in the defense forces, in medical care for armed forces and in maintaining services for the civilian population.

If the usual procedure is followed, officers of the American Medical Association will be required to remain in Washington for the duration of the trial, a period that may run into weeks and months. At the same time, they will be forced to exert every effort at long range, to assemble and tabulate the enormous amount of information about the medical men of the country that was asked of them by the Surgeon General of the Army at the New York meeting.

The burden placed upon them at this critical time will seem the more indefensible to casual observers in view of the fantastic nature of the charges against which they are now called upon to defend themselves.

SICKNESS INSURANCE IN WISCONSIN

Experiments in sickness insurance in Wisconsin are now approaching a point where valid estimates can be made on their comparative popularity and soundness.

Several other states are also engaged in medically sponsored experimentation in this type of insurance but in no other state have three different plans been set up on a definitely experimental basis. Wisconsin's experience as set forth in extensive reports prepared for the September meeting of the House of Delegates of the Wisconsin State Medical Society therefore provides by far the most interesting information yet made available to students of new forms of payment for medical services.

Douglas County Coöperative

The first of these experiments was placed in actual service operation in Douglas County on July, 1939. It was a plan for prepaid medical care as conceived, organized and managed by a coöperative lay group.. Contract provisions, premiums, benefits and similar items were accepted by the medical profession "without expression of judgment." Membership was open to any resident of Douglas county. Premiums as established by the lay group were $2.90 per month per family; $2.25 per month for man and wife and $1.50 per month per single person. Each person applying was required to give a medical history in writing and to submit to and pay for a special physical examination. The subscriber was then eligible to complete physician's care without limitation as to extent or quantity.

Demand Limited

Committee comments in brief on a year's experience are as follows:

1. There is a very limited demand for medical care on a prepayment basis. After intensive and continuous membership drives, there were only 235 members at the end of June, 1940, a gain of only 97 over the subscribers in August, 1939. Most of them, furthermore, were in the income group above $1,200 and all were of the "prompt pay class."

2. Physicians were paid an average of 71 per cent of normal charges in private practice; but the average would have been 55½ per cent if the plan had not received administrative contributions from the State Society. Contrary to predictions by coöperative association leaders, receipts were below what the same physicians would have received from the same patients in private practice.

3. Widespread duplication of the Douglas county plan would be feasible only if there were large reserves of cash to draw upon or if a $15 initiation fee were to be charged for each subscriber unit.

4. There was no evidence to indicate that there was a larger use of preventive measures by subscribers to the prepaid service than by others or by the same patients previous to entry into the plan. At the same time there was no marked nuisance demand for physician's care in this group which, in any case, could be placed definitely in the category of substantial, honest and reliable people.

Milwaukee Plan

The second experiment was placed in operation in Milwaukee on November 1, 1939. This plan was under direct sponsorship of the Milwaukee County Medical Society and its distinguishing feature was that each subscriber unit was obliged to pay the first $24 worth of service from a physician member of the panel before he became eligible for services under the plan. After the initial payment, subscribers were entitled to unlimited care throughout the year so long as premiums were paid. Subscribers are selected on a group basis. Premiums are $1.00 per family, 75 cents per month for man and wife, and 50 cents per month for a single person.

After an exhaustive campaign for subscribers, the required minimum of 200 was secured at Greendale, a Federal Government Housing project near Milwaukee, but further solicitation of other groups and of a large number of Milwaukee industries failed to secure a sufficient number of subscribers to warrant extending the plan to them.

During the first three months only one statement of $57 of which $24 was paid by the patient, met the qualifications. During the second quarter seven became eligible and at the beginning of the third quarter, 21, or 10 per cent, had met all the demands. On July 1, 36, or 21 per cent, had met the demands. By the end of the second quarter an estimated $1,500 worth of service had been rendered to 21 subscriber families eligible for service under the plan. Of this amount a net of $1,200 was paid to participating physicians.

Interest Slight

Comments by the committee follow:

1. Limited experience with this plan indicates that the deductible feature is basically sound and

should be included in some manner in future experimentation by the society.

2. The fact that there is very little uncultivated demand was shown in Milwaukee county as in Douglas county. The same lack of interest was noticed in the industrial groups solicited as at Parklawn where the requisite 200 subscribers were finally secured out of 600 families.

3. In this instance there was a notable lack of interest and coöperation among some of the physicians, also, particularly, those associated with industrial plants.

No Sale in Rock County

The third experiment initiated in Rock county by the physicians was never placed in actual operation because of lack of subscribers, but was offered for sale August 16, 1939. The plan was designed by the local medical profession, 75 per cent of whom participated. The premiums were set at $3 per month per family, $2 for man and wife, and $1.50 for single persons. Selection of subscribers was based upon the group theory. Any group organized on other than a health basis was eligible if 50 per cent of the group participated. The medical service committee of the medical society directed solicitation. They were assisted by the assistant secretary of the State Medical Society of Wisconsin and an energetic campaign of personal solicitation and letters was carried on. Meetings were organized to explain the plan to industrial groups, pamphlets were distributed in pay envelopes and in doctors waiting rooms.

Chief Reaction Indifference

The committee said:

1. Virtually the only interest shown in the plan came from those with incomes above the limits set by the physicians. The reaction of others was chiefly one of indifference.

2. Several employers declared they would prefer to purchase insurance from a company with an established financial reserve in spite of the fact that the physicians themselves represent the actual and definite reserves of the plan proposed.

In no case were 50 per cent of the members of any group willing to join in the plan.

Reason Why

Just what the delegates to the House of Delegates of the Wisconsin Society will do with this report is uncertain. They may or may not discontinue the experiments in September.

It is clear, however, that the popular demand for sickness insurance which the enthusiasts have always cited does not exist in three typical sections of Wisconsin. The probability is that it does not exist in Minnesota, either, nor anywhere else in the United States.

Reasons given by individuals who rejected the invitation to participate in these three plans were essentially economic in nature. They are summarized by the committee this way—

1. Lack of proper appreciation or evaluation of the comparative values of budgeting for medical care and of budgeting for such obligations as radio, appliances and automobiles.

2. Physicians' services during the past several years have not averaged the annual premium costs of $36 a year.

3. Lack of funds on the part of some prospective subscribers.

4. Premiums are too high in the opinion of others.

IS IT CRIMINAL TO SAVE?

[Monthly Editorial Prepared by the Medical Advisory Committee]

Vital statistics show that a remarkable change in death rate in most diseases is taking place in this country and that consequently the span of life is increasing. Certainly this can be credited in great part to the type of medicine that is being practiced by our profession in the United States.

From hospital statistics, no less noticeable is the fact that fewer and fewer amputations are being performed in the cases of badly injured extremities. To those men who have practiced for a quarter of a century or more, the picture of the amputating knife is a familiar one; the painful stump, a "bug bear" and the artificial leg or arm, a commonplace.

Today, owing to the knowledge of asepsis, debridement, extension and the newer drugs employed, the mangled, torn, compound comminuted fracture is brought into alignment and a fairly serviceable extremity is the result. It is an acknowledged fact that a live leg or arm which has 75 per cent of its former efficiency is much better than the best that the most pro-

ficient artificial limb-maker with his mechanical skill can produce.

Yet, the medical man who not only saves the life of the patient but also gives him a good leg to use may be subjected to a malpractice suit because he could not again reproduce *in toto* the fine anatomic relations which prevailed before the accident. Why men who do remarkable restorations in these cases should be exposed, as any criminal might, to court ridicule is beyond the comprehension of your Medical Advisory Committee.

—B. J. B.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

Saint Paul, Minnesota

Julian F. DuBois, M.D., Secretary

Scott County Drug Addict Committed to Willmar State Hospital

Re. State of Minnesota vs. Merten J. Stratton.

On August 7, 1940, Judge F. J. Connolly of the Probate Court of Scott County, made an order committing the above defendant, who is 45 years of age, to the State Hospital at Willmar, Minnesota, for treatment of drug addiction. Stratton, who resided at Belle Plaine, Minnesota, pleaded guilty on April 2, 1940, in the District Court of Scott County, to an information charging him with the crime of obtaining narcotic drugs by fraud and deceit. Judge Joseph J. Moriarty of the District Court, sentenced Stratton to a term of not to exceed 5 years at the State Prison at Stillwater, and suspended the sentence upon the condition that Stratton, who has used narcotics over a period of the past 20 years, be admitted to the Federal Hospital for Narcotics at Lexington, Kentucky, for treatment. Stratton made application to that hospital and was admitted on May 8, 1940.

Notwithstanding the fact that Judge Moriarity had provided in his order that Stratton was to remain at the Federal Hospital until he was certified by the proper authorities of that Hospital as cured, Stratton left against medical advice on July 31, 1940. He returned to Belle Plaine where he was found asleep in the reception room of a physician's office on August 4, 1940. The Minnesota State Board of Medical Examiners was notified and following a conference between Harry A. Irwin, County Attorney of Scott County, Judge Moriarity, and Mr. Brist representing the Medical Board, Judge Moriarty made an order revoking Stratton's suspended sentence, and providing that he be taken to the State Prison at Stillwater, Minnesota, unless, within 10 days, Stratton had been committed by the Probate Court of that County to the State Hospital at Willmar, for treatment of his drug addiction. On August 7, 1940, Judge F. J. Connolly of the Probate Court of Scott County, made an order committing Stratton to the State Hospital. Judge Moriarty's order also provides that unless Stratton remains at that Hospital for not less than one year, he must serve his sentence at the State Prison.

LIST OF PHYSICIANS LICENSED BY THE MINNESOTA STATE BOARD OF MEDICAL EXAMINERS ON JULY 12, 1940

June Examination

Alway, Robert Hamilton—U. of Minn., M.B. 1930; M.D. 1940, Saint Paul.

Ankner, Frank Joseph—Rush Med. Col., M.D. 1938, Thief River Falls.

Barnes, Russell George, Jr.—U. of Minn., M.B. 1938; M.D. 1939, Hastings.

Beck, Charles Joel—U. of Minn., M.B. 1940, Butte, Mont.

Beck, Norman Russell—U. of Pa., M.D. 1937, Rochester.

Bowers, Robert Newcomb—U. of Minn., M.B. 1939; M.D. 1940, Mazeppa.

Bratrud, Theodor Edward—Marquette U., M.D. 1940, Minneapolis.

Butter, John Robinson—U. of Minn., M.B. 1940, Eloise, Mich.

Decker, Charles Henry—U. of Minn., M.B. 1940, Eloise, Mich.

Domeier, Luverne Henry—Loyola, M.D., 1940, Sleepy Eye.

Drapiewski, John Frank—Harvard U., M.D. 1937, Rochester.

Drexler, George Warren—U. of Minn., M.B. 1939, Minneapolis.

Dupont, Joseph Arthur—Loyola, M.D. 1940, Excelsior.

Eckdale, John Edward—U. of Minn., M.B. 1939; M.D. 1940, Minneapolis.

Erickson, Eldon Wesley—U. of Minn., M.B. 1939; M.D. 1940, Minneapolis.

Estrem, Robert Daniel—U. of Minn., M.B. 1940, Fergus Falls.

Ferguson, William James, Jr.—Rush Med. Col., M.D. 1938, Chicago, Ill.

Francis, Gilbert Smuin—Northwestern U., M.B. 1939; M.D. 1940, Morgan, Utah.

Friberg, Joseph Bertil—U. of Minn., M.B. 1940, Saint Paul.

Friedman, Harry Samuel—U. of Minn., M.B. 1939; M.D. 1940, Minneapolis.

Gouze, Frank John—U. of Minn., M.B. 1940, Duluth.

Harper, Harry Penn—U. of Minn., M.B. 1936; M.D. 1937, Rochester.

Harri, Edward John—U. of Minn., M.B. 1940, Duluth.

Ives, Howard Rollin, Jr.—Yale U., M.D. 1937, Rochester.

James, Ellery Meredith—Marquette U., M.D. 1940, Mankato.

Joffe, Harold Herman—U. of Ill., M.B. 1940, Duluth.

Joss, Charles Stevens—Northwestern U., M.B. 1939; M.D. 1940, Rochester.

Jurdy, Mitchell Joseph—U. of Minn., M.B. 1940, Minneapolis.

Kelly, Albert Charles—Marquette U., M.D. 1940, Coleraine.

Leeman, Judson Sheppard—U. of Minn., M.B. 1940, Newark, N.J.

Lehman, William Louis—U. of Minn., M.B. 1937; M.D. 1938, Minneapolis.

Lindahl, Wallace William—Northwestern U., M.B. 1938; M.D. 1939, Rochester.

Melancon, Joseph Francis—Marquette U., M.D. 1940, Saint Paul.

Nachtigal, Irving M.—U. of Minn., M.B. 1940, Eveleth.

Newell, Frank William—Loyola U., M.D. 1940, Saint Paul.

Papermaster, Ralph—U. of Minn., M.B. 1940, Minneapolis.

Patterson, Hugh Donald—U. of Minn., M.B. 1940, New Orleans, La.

Pearson, Lawrence Orville Hicks—U. of Minn., M.B. 1940, Saint Paul.
Rosendahl, Frederick Glasoe—U. of Minn., M.B. 1939; M.D. 1940, Saint Paul.
Schmitz, Everett Joseph—U. of Minn., M.B. 1940, Minneapolis.
Shaw, Howard Arthur—U. of Minn., M.B. 1940, Minot, No. Dakota.
Shea, Andrew Whitman—U. of Minn., M.B. 1940, Minneapolis.
Smedal, Harald Aasvald—Harvard U., M.D. 1936, Rochester.
Soucheray, Philip Henry—U. of Minn., M.B. 1940, Jersey City, N. J.
Stark, Frederick Mosier—U. of Minn., M.B. 1940, Saint Paul.
Sutch, Gabriel Charles—U. of Minn., M.B. 1940, Saint Paul.
Tornberg, Gordon Carl—U. of Minn., M.B. 1939; M.D. 1940, Ely.
Williams, Ray David—Washington U., M.D. 1937, Rochester.
Wood, Clyde Othur—U. of So. Calif., M.D. 1937, Rochester.

By Reciprocity

Clauson, Carl Theron—U. of Wis., M.D. 1928, Bloomer, Wis.
Ittner, George Wash., Jr.—Washington U., M.D. 1937, Saint Paul.
Kucera, Lad John—Creighton U., M.D. 1939, Omaha, Neb.
Pierson, Roy Fredolph—U. of Neb., M.D. 1938, Slayton.

National Board Credentials

Duffalo, John August, Jr.—U. of Minn., M.B. 1939; M.D. 1940, Minneapolis.
Wood, William Walter, Jr.—U. of Minn., M.B. 1937; M.D. 1938, Rochester.

TREATMENT OF HABITUAL ABORTION WITH VITAMIN E

The Council on Pharmacy and Chemistry authorized publication of a report, prepared for it by one of its referees, on the value of vitamin E in the treatment of various disorders, particularly with reference to its alleged usefulness in habitual abortions. A critical examination of the evidence presented during the last eight years led to the following conclusions:

Claims that vitamin E (wheat germ oil) is of value in the treatment of menstrual disorders, failure of lactation and the vaginal pruitus after the menopause cannot be accepted because of lack of sufficient clinical evidence.

The claim that vitamin E is of value in the prevention of habitual abortion cannot be accepted because of the lack of convincing clinical evidence. The diagnosis of habitual abortion in many of the published reports is open to question; the great variation in dosage of vitamin E and the lack of evidence that the preparations used were active make it difficult to attribute any effects claimed for it to the vitamin. Moreover, the expectancy of spontaneous cure in cases of so-called habitual abortion has not been accurately established.

Although the administration of wheat germ oil probably does not cause the development of neoplasms, unfavorable effects may follow its use in certain cases. These effects are usually not serious.

The published results of the treatment of habitual abortion with vitamin E are sufficiently encouraging to justify further clinical experiment. Such experiments are justified only if preparations of vitamin E of known activity are used and if adequate diagnosis and clinical control can be established. (J.A.M.A., June 1, 1940, p. 2214.)

In Memoriam

William A. Beach

Dr. William A. Beach, Mankato, died following a stroke June 12, 1940, at the age of seventy-one.

Dr. Beach was born at Ionia, Michigan, in 1868 and came to Minneapolis with his parents at the age of eleven. He graduated from the homeopathic department of the University of Minnesota medical school in 1893 and practiced for a short time at Windom and Saint Paul before locating in Mankato more than fifty years ago.

Dr. Beach was mayor of Mankato in 1921 and again in 1925 and served as city health officer from 1933 to 1935. He was also a member of the Mankato board of education over a long period of years. His extensive career as a public official was marked by the ardor with which he supported his convictions. For years he campaigned for regulation of the city's milk supply, urging city inspection of dairy herds and compulsory pasteurization of the milk supply of the city.

Dr. Beach is survived by his widow and two children, William E. Beach, Mankato and Mrs. William Lloyd, Albert Lea, and two step-daughters, Mrs. J. S. Graham, Minneapolis and Mrs. Theodore Wells, Grand Forks, North Dakota.

Frank W. Brey

Dr. Frank W. Brey of Wabasso died June 8, 1940, after suffering from a brain tumor for some nine months.

Dr. Brey was born in Lafayette township on March 22, 1886. He graduated from high school in New Ulm in 1904. He graduated from the medical school of the University of Minnesota in 1910, and began practice at Wabasso.

On November 21, 1921, Dr. Brey married Elizabeth K. Daub. His widow and six children, Anna Catherine, Theressa E., Alois, Virginia, Paul and Justine survive him.

Dr. Brey was a member of the Redwood-Brown County Medical Society, the Minnesota State and American Medical Associations. He was an upright citizen, at all times displaying a keen interest in community affairs. During his career he served on the school board, was village health officer and Redwood County coroner, besides being a member of various clubs and societies.

George A. Holdridge

Dr. George A. Holdridge, for nearly forty years leading physician, beloved country doctor of Benton County, was killed in an automobile accident July 3, 1940, as he was returning from a professional call.

Dr. Holdridge was born in Newark Valley, New York, March 31, 1879. He was graduated from Belle-

vue Hospital Medical College in 1900 at the age of twenty-one, the youngest member of his class. Shortly after graduating he came to Foley, Minnesota, where he established a successful practice. In 1907, he moved to Holdingford, Minnesota, where he practiced for two years, returning to Foley in 1909 in response to popular demand.

Dr. Holdridge was a man of sterling character and sound judgment. He took active part in community affairs and quickly became not only physician to every family in the county but trusted friend and wise counselor as well. He will long be remembered as a kind, generous neighbor, never too weary to lend a hand to every worthy cause, never too busy to pause for a cordial word or a cheery greeting as he went about his work. To say that he will be greatly missed in his community conveys but a fraction of the deep sense of loss his friends and co-workers feel at his tragic passing.

Dr. Holdridge served as chairman of the Benton County Health Association for thirty years; he acted as County Coroner for several years. He was a member of the Stearns-Benton County Medical Society, the Minnesota State Medical Association and the American Medical Association. Besides his medical work he served as County Commissioner for eight years, acting as chairman of the Board from 1933 to 1939.

In 1902 Dr. Holdridge married Fannie E. Osborne who, with a son, William, and three daughters, Ida, Katherine, and Helen, survive him. Two sisters and one brother also survive.

Herbert W. Jones

Dr. Herbert W. Jones who had practiced medicine in Minneapolis for thirty-five years, died suddenly while returning from Cottage Grove, Minnesota, on July 9, 1940.

Dr. Jones was born in Berlin, Wisconsin, on October 13, 1873. He was the son of Griffith Franklin Jones of Berlin, a merchant. His grandparents were pioneers in that section of Wisconsin. He obtained his preliminary education in Berlin and later took his medical course at the University of Minnesota. He was captain of the University track team in 1900. He graduated in 1902 and then took a year's interneship at St. Luke's Hospital, Saint Paul. After finishing his interneship he went to Faulkton, South Dakota, to take over the practice of Dr. Edgerton for a short time. In 1905 he returned to Minneapolis and became associated with the late Dr. W. A. Jones, with whom he practiced for about ten years. In 1906 he went to Vienna where he took a course in neurological and general surgery for a year and then returned to Minneapolis associating himself with Dr. W. A. Jones and Dr. A. S. Hamilton.

In June, 1909, Dr. Jones married Margaret Daniels of Minneapolis.

Dr. Jones was very much interested in the Medical Alumni of the University of Minnesota. He was secretary of the organization for a number of years and at one time its president. It was his desire that the alumni body should act in an advisory capacity to the teaching faculty and Regents of the University, and he spent much time on committees working to help in the development of the medical department. Much of the success of the medical alumni was due to the indefatigable efforts of Dr. Jones in its incipient stage.

Dr. Jones was a member of the Asbury and Northwestern Hospital staffs, and was president of the Northwestern Hospital staff in 1936 and 1937. He was also an honorary member of the American Neurological Association, a member of the Minnesota Academy of Medicine, American Medical Association, Hennepin County Medical Society and other state and county associations. He was a member of the Nu Sig Nu Fraternity and the M Club at the University of Minnesota. He associated himself with the Westminster Church.

Dr. Jones was held in high esteem by all of his colleagues. He had good judgment which was appreciated by the medical profession. Many of the early operations in neurological surgery in Minneapolis were performed by him.

Dr. Jones, who lived at 2418 W. 22nd Street, is survived by his wife, three sons, Dr. H. W. Jones, Jr., who has occupied offices with his father since his graduation in medicine; Roderick Daniel, and David Griffith, and two sisters, Mrs. R. E. Daniel of Minneapolis and Minnie W. Jones of DeKalb, Illinois.

A. E. Benjamin, M.D.

Earl H. Marcum

Dr. Earl H. Marcum, Bemidji, died August 5, 1940, following injuries sustained in an automobile accident three days previous.

Dr. Marcum was born August 14, 1878, in southeastern Iowa, but moved to Crookston, Minnesota, with his parents in 1880. After attending high school in Crookston he attended Hahneman Medical College in Chicago, graduating in 1903. He began practice the same year in Bemidji.

In August, 1917, Dr. Marcum entered the service and was stationed at Fort Riley, Chicago University and Rush Medical College. He later went to France with the Twentieth Evacuation Hospital and had much surgical experience there.

In 1925 Dr. Marcum visited England, Ireland, France and Belgium as a member of the party of 850 in the Inter-State Postgraduate group.

Dr. Marcum was married in 1902 at Crookston to Elizabeth Davies. He is survived by his widow and his brother, Walter F. Marcum, of Bemidji.

Dr. Marcum was a member of the Upper Mississippi Medical Society, the Minnesota State and American Medical Associations. He was active in the civic and fraternal life of Bemidji, being identified with various movements for the betterment of the city. Serving as captain in the medical corps of the army during the World War he was later promoted to major and still later lieutenant colonel in the Medical Corps Reserve. He had passed the examinations for a full colonelcy and had expected to receive that commission shortly.

OF GENERAL INTEREST

Dr. and Mrs. O. J. Campbell of Minneapolis announce the birth of a daughter, August 5.

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Dr. and Mrs. E. V. Strand and children of Bayport recently spent a week motoring on the North Shore.

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A daughter was born July 31 to Dr. and Mrs. Harvey J. Brekke of Minneapolis.

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A son was born to Dr. and Mrs. Philip A. Anderson of Minneapolis, July 23.

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Dr. C. H. Sherman of Bayport has moved his office to Stillwater .

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Dr. C. F. Dixon of Rochester addressed a meeting of the Wyoming State Medical Society in Sheridan last month.

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Dr. Roscoe C. Webb of Minneapolis has been elected secretary-treasurer of the Great Northern Railway Surgeons' Association.

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Dr. and Mrs. D. Kalinoff and Miss Helen Kalinoff returned to Stillwater about the first of June after an extended visit in the South.

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Dr. Siegfried C. G. Oeljen of Waseca has moved into his newly completed office building north of the courthouse. The building, which houses only his offices, is of brick and is 22 x 47 feet.

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Dr. John R. Meade of Saint Paul announces the limitation of his practice to Internal Medicine, and also removal of his offices to 836 Lowry Medical Arts Building, Saint Paul.

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Dr. Hugh W. Hawn has finished a fellowship in ophthalmology in the Mayo Foundation in Rochester and is now a member of the staff of the Fargo Clinic, Fargo, North Dakota.

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Dr. P. E. Kierland of Alexandria made newspaper headlines recently when he rescued two fishermen whose boat upset on Lake Mina. A third man in the boat died of a heart attack.

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Dr. Charles H. Mead of Duluth recently passed the National Board examinations in surgery. It is believed he has the distinction of being the first Duluth surgeon to have passed the examination.

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Dr. William C. Bernstein, who has been practicing in New Richland, has entered the University of Minnesota graduate school to do work in proctology for two years.

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Dr. M. O. Henry addressed the Pierce-St. Croix Counties Medical Society on "Treatment of Fractures of the Upper Extremities" Thursday, August 15, at Baldwin, Wisconsin.

Dr. William M. Moir, Jr., of Minneapolis, who has been a resident physician in internal medicine at the University of Minnesota Hospitals, became associated with Dr. W. R. Humphrey of Stillwater, July 1.

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Dr. Frank F. Wildebush of Minneapolis, Lieutenant Commander, Medical Corps, U. S. Naval Reserve, is taking special work in head and neck surgery at the Naval Medical Center in Washington, D. C.

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Miss Margaret G. Arnstein has resigned as director of public health nursing at the University of Minnesota to rejoin the staff of the New York State Health department. Miss Mellie F. Palmer has been named acting director.

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Dr. George B. Logan, who has been associated with the Department of Pediatrics at the University of Minnesota Medical School since January 1, 1940, has returned to the Mayo Clinic as a first assistant in the Section on Pediatrics.

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The marriage of Dr. William H. Hollinshead, Jr., and Miss Mary Waddell of Saint Paul took place July 16. Dr. James B. Avey of Excelsior was best man. Among the ushers were Dr. Robert Alway and Dr. Charles Naumann McCloud, Jr.

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Dr. Robert Gray, a graduate of Northwestern University Medical School, has located in Marshall and is associated with his father, Dr. F. D. Gray, and Dr. B. C. Ford in the Marshall Hospital and Clinic. He interned in the Swedish Covenant Hospital in Chicago.

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Dr. Marvin J. Stewart has located at Marietta, opening offices there late in July. A graduate of the University of Minnesota Medical School, Dr. Stewart for the past year has been resident physician and surgeon at the Miller Hospital in Minneapolis.

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Dr. R. G. Barnes, Jr., of Duluth is now associated with Dr. R. C. Radabaugh in Hastings. Dr. Barnes, who was graduated from the University of Minnesota Medical School, has been located at Hackensack, New Jersey.

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Dr. Marcus H. Flinter, head of the Cass Lake Indian Hospital at Cass Lake, has been transferred to Arizona where he will be in charge of an Indian tuberculosis sanitarium at Phoenix. His successor in Cass Lake has not yet been named.

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Dr. Richard B. Girvin has been appointed Minneapolis medical examiner for the Civil Aeronautics Authority. This post was formerly held by Dr. Albert J. Herbolsheimer who is now in Washington, D. C., with the CAA.

Dr. C. H. Sherman has located in Stillwater, opening offices at 228 East Chestnut street. For the past year, Dr. Sherman has been associated in practice with Dr. E. V. Strand of Bayport. He previously practiced in Oakes, North Dakota.

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Dr. James A. Johnson of Minneapolis does not shirk his responsibilities as a member of medical associations. He is serving as president of three different groups—the Minneapolis Surgical Society, the Minnesota Academy of Medicine, and the Hennepin County Medical Society.

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Dr. Miland E. Knapp of Minneapolis, third vice president of the American Congress of Physical Therapy, will present a paper at the nineteenth annual meeting of the Congress in Cleveland, September 2-6. His paper will be on the rôle of physical therapy in the treatment of fractures about the elbow joint.

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Construction of a nurses' dormitory and Mother House at the Lutheran Deaconess Home and Hospital in Minneapolis is expected to get under way soon. The new structure, whose cost is estimated at $75,000, will be ready for occupancy shortly after the first of the year.

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Dr. Robert H. LaBree, a member of the Rood Hospital staff in Chisholm, and Miss Bernardine Brown were married July 20 in Hibbing. Dr. John W. LaBree was his brother's best man. Included among the ushers were Dr. Carlyle Tingdale and Dr. Theodore Schweiger.

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Dr. Charles K. Petter, who was formerly associated with Glen Lake Sanatorium, is medical director and superintendent of the Lake County Tuberculosis Sanatorium in Waukegan, Illinois, which recently completed construction of a new modern building. Dedication exercises were conducted August 18.

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Dr. G. J. Shima of Montgomery opened offices in Sleepy Eye in August. Dr. Shima, who received his B.A. degree from the University of Minnesota, took his medical work at Creighton University in Omaha, receiving his M.D. degree in 1939. He recently completed a year's interneship at St. Joseph's Hospital in St. Paul.

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Dr. Milton LeVine, who received his Ph.D. degree in bacteriology from the University of Minnesota in June, 1939, has been appointed instructor in bacteriology, succeeding Dr. M. V. Novak who resigned last spring to take a post as assistant professor at the University of Illinois College of Medicine.

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Dr. Elmer C. Paulson, son of Dr. and Mrs. T. S. Paulson of Fergus Falls, married Miss Ethel Mobraaten of Virginia, August 3. After a wedding trip at Yellowstone Park and the Black Hills, Dr. and Mrs. Paulson are at home at Dalton. Dr. Paulson has been in general practice at Dalton for the past two years.

Dr. John W. Johnson, who has completed a residency at the General Hospital in Wyandotte, Michigan, has become associated in practice with his father, Dr. Hans Johnson at Kerkhoven, Minnesota. Dr. Johnson is a graduate of the University of Minnesota Medical School, '38. The building in which they have their offices has been remodeled, and an addition constructed.

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Dr. Robert D. Evans of Minneapolis, accompanied by his daughter, Betty Jo, and his son, Robert, Jr., motored to California in June. They visited the Bryce and Zion Canyons in Utah enroute and had an interesting experience taking colored movies and Kodachrome "stills." Both of these national parks are a paradise for the amateur color photographer, they report.

* * *

Dr. George T. LeClercq, a graduate of the University of Minnesota Medical School, became affiliated in July with the Massachusetts General Hospital in Boston where he is doing special work in radiology. For six months prior to becoming associated with Massachusetts General Hospital, Dr. LeClercq was a graduate student at Peter Bent Brigham hospital.

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Dr. R. Wynn Kearney has opened offices for the general practice of medicine and surgery in Mankato. Dr. Kearney is a graduate of the Mankato high school and of the Northwestern University Medical School. After receiving his medical degree from Northwestern in 1935, he interned at Ancker Hospital in Saint Paul. Since 1936, he has been a fellow in the Mayo Foundation in Rochester.

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Organization of the Long Prairie Clinic and Hospital at Long Prairie by Drs. M. G. Ericsson, B. L. Gifford and M. E. Mosby is announced. The new arrangement gives Long Prairie one hospital instead of two. The hospital facilities will be available to doctors in the area.

Construction of an addition to the present Long Prairie hospital, which will also be completely remodeled, is now under way.

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For the first time, internes taking duty in Minneapolis hospitals in July automatically become Junior Members of the Hennepin County Medical Society. Their membership continues as long as their status as internes continues. This new membership ruling was voted by the Society last November, and became effective with the new July group of internes. Fellows and Residents make individual application for Junior Membership as previously.

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Among new Diplomates of National Boards through examination are Drs. Abe Bert Baker and Nathaniel Joseph Berkwitz of Minneapolis who have been certified by the American Board of Psychiatry and Neurology; Dr. Reuben Berman of Minneapolis, by the American Board of Internal Medicine; Dr. Lawrence Myrlin Larson, by the American Board of Surgery, and Dr. Robert Russell Tracht, by the American Board of Ophthalmology.

Among Minneapolis physicians who have been soldiers and sailors this summer are: Drs. Abe B. Baker, Philip Hallock and Theodore H. Sweetser who gave ear to bugle calls at Fort Snelling; Dr. John A. C. Leland, Jr., who has been at San Diego Naval Base; Drs. Einer C. Andreassen, Harry F. Bayard, Ralph H. Creighton, George F. Schmidt and Frederic F. Wipperman, Camp Ripley; Dr. Donald McCarthy who cruised the Great Lakes aboard the "Paducah."

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Speakers at the summer meeting of the Upper Mississippi Valley Medical Society at Cass Lake, August 9-10, included besides Dr. Michelson, Dr. C. A. Stewart of Minneapolis who spoke on "Infant Feeding"; Dr. F. L. Smith of Rochester whose paper was entitled, "Diagnosis and Treatment of Conditions Associated with Varicose Veins"; and Dr. Macnider Wetherby of Minneapolis who discussed "Rheumatic Conditions."

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Returning to Minneapolis August 11 after speaking before a meeting of the Upper Mississippi Valley Medical Society at Cass Lake, Dr. Henry E. Michelson of Minneapolis was injured when his automobile was struck by another machine being pursued by Brainerd police. Dr. Michelson, who received a fractured patella, several fractured ribs and minor head injuries, has been confined to Northwestern Hospital in Minneapolis since.

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The wife and children of a former fellow in the Mayo Foundation have arrived in Rochester from England to be guests of Dr. and Mrs. V. S. Counseller for the duration of the war. They are Mrs. A. H. McIndoe and her children, Vanora and Adonia. Dr. McIndoe is chief plastic surgeon to the Royal Air Force.

Also from England have come Mrs. C. Nauton Morgan and her children, Sally and Michael, to be guests of Dr. and Mrs. C. W. Mayo at Rochester during the war.

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The George B. Wright Memorial Hospital of Fergus Falls dedicated on July 25 a beautiful new community room, furnished by patrons of the hospital. The room is to be used for meetings of the staff and auxiliary, and for health instruction for hospital patients and people of the community.

Speaker at the dedicatory exercises was Dr. W. A. O'Brien of Minneapolis who spoke on "The Place of the Community Hospital and The Care of the Sick." Gabriel A. Skomars is hospital administrator.

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Two Minnesota physicians are scheduled to participate in the Jackson County Health Forum in Kansas City, Missouri, during the 1940-41 season. The forum of lectures given on the third Wednesday of each month is sponsored by auxiliaries of all the accredited hospitals in Jackson County. Dr. Walter C. Alvarez of Rochester is scheduled to give the November 20 lecture. His subject will be "What's the Matter with the Patient Who Is Tired All the Time?" Dr. William A. O'Brien of Minneapolis will give the final lecture, May 21, his topic being "Medicine Meets Middle Age Needs."

Among those who began fellowships in the Mayo Foundation, July 1, are Dr. Eldon W. Erickson of Minneapolis and Dr. Charles W. Fogarty of St. Paul, graduates of the University of Minnesota Medical School; Dr. Charles F. Stroebel of Northfield; Dr. David B. Judd of Rochester, son of the late Dr. E. Starr Judd; Dr. Frank S. Ashburn who was a fellow in medicine at the University of Minnesota on duty in Minneapolis General Hospital from 1939-40; Dr. George A. Hallenbeck of Rochester, son of Dr. D. F. Hallenbeck; Dr. Richardson W. Lyman who interned at the University Hospitals in Minneapolis from July, 1939 to July, 1940; Dr. William J. Ferguson who was interne at Minneapolis General Hospital from January, 1939, to July, 1940; and Dr. Richard E. Reiley who was interne at Fairview Hospital in Minneapolis 1938-39, and teaching fellow in orthopedic surgery at the University of Minnesota from July, 1939 to July, 1940.

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Dr. Orin P. Thorson of Northfield has disposed of his practice and is taking postgraduate work in Chicago and at the University of Minnesota before leaving October 1 to join the Benson Clinic in Bremerton, Washington. Dr. Thorson, a University of Minnesota graduate, has been in Northfield for twelve years. In his new location he will do diagnostic work and assist in surgery.

Dr. Robert F. Mears, recently of the General Hospital in Minneapolis, is taking over Dr. Thorson's practice. Dr. Mears is a graduate of the University of Minnesota Medical School.

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Dr. O. J. Hagen of Moorhead has filed as a candidate for the Republican nomination for the United States Senate. Dr. Hagen is prominent in educational circles, as well as medical activities, having served six years as a member of the University of Minnesota board of regents and eight years on the State Teachers college board.

He was president of the Minnesota Public Health association in 1936; a member of the state board of health for some time; a councilor for Minnesota of the American College of Surgeons for five years; president of the Northern Minnesota Medical Association; and president of the Clay-Becker county sanatorium for seven years.

Another Minnesota physician who may enter the political race is Dr. J. Lawrence McLeod of Grand Rapids, whose friends are urging him to run as a Republican candidate for lieutenant governor.

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When the continuation course in Clinical Allergy was held at the University of Minnesota Center for Continuation Study July 29-August 3, physicians from four states were in attendance.

The registration list follows: Drs. Percival H. Bennion of St. Paul, Luther F. Davis of Wadena, J. W. Helland of Spring Grove, Samuel J. Hillis of Minneapolis, Fritz B. Schleinitz of Battle Lake and Thomas Myers of St. Paul; also Dr. Robert W. Currie of Billings, Montana, and Dr. Homer L. Hiles of Pittsburgh, Pennsylvania. From Wisconsin came Drs. Enoch

B. Brick of Wausau, Harold L. Miller of Milwaukee, Margaret V. Pirsch of Kenosha and Raymond H. Smits of West Allis.

The faculty for the course was made up of: Drs. Walter C. Alvarez, Louis A. Brunsting and Charles K. Maytum of Rochester; Beecher B. Barnum and J. M. Nolte of Minneapolis; and Drs. Lawrence R. Boies, Ralph V. Ellis, Ralph W. Koucky, William A. O'Brien, Elmer M. Rusten, Wallace Sako, Albert V. Stoesser, Horatio B. Sweetser, Jr., and Asher A. White of Minneapolis.

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Medico-Military Inactive Status Training

The twelfth annual inactive status training course for Medical Department Reserve officers of the U. S. Army and Navy will be held at the Mayo Foundation, Rochester, Minnesota, October 6 to 20, 1940. As in former years, special work in clinics and hospitals will be offered during the morning hours for those asking special assignments. Presentations of selected subjects in military medicine are scheduled. There will be appropriate sections or special courses for officers of the Dental and Veterinary Corps. All Medical Department Reserve officers on the active list are eligible for enrollment. Approved applicants will be enrolled on the recommendation of the Surgeon of the Seventh Corps Area or the Surgeon of the Ninth Naval District. Applications should be made at an early date and should be forwarded through the respective Reserve headquarters of the officers concerned.

Physicians Wanted for CCC Duty

Physicians are needed for the medical service of the Civilian Conservation Corps. The initial salary is $3,200 per annum. No quarters for families are provided, and the physicians are required to pay for their food at camps. Temporary quarters for physicians are provided at the camps for a nominal fee. Physicians selected for this service are required to pay their own travel expenses to the headquarters of the district in which they are to be employed, where they are put on temporary duty for instructional purposes before being sent to camps. Travel expenses incurred in the transfer of physicians from the district headquarters to camps or in transfer from one camp to another are paid by the Government. If the services rendered are satisfactory, the employment is more or less permanent.

The principal duties at camps consist of the medical care of the enrollees and the practice of preventive medicine. To be eligible for this service, the physician must be a citizen of the United States, a graduate of an accredited medical school authorized to confer the degree of doctor of medicine, licensed to practice medicine, and physically able to perform the duties involved. Physicians over sixty years of age are not ordinarily employed.

All physicians interested in this type of service are requested to submit their applications to the Office of the Surgeon, Headquarters Seventh Corps Area, Federal Building, Omaha, Nebraska, giving date on which available and preference of assignment in the following states: Minnesota, North Dakota, South Dakota, Iowa, Nebraska, Missouri, Kansas, and Arkansas.

It is requested that young physicians not now listed in the American Medical Directory be informed of this service.

Physicians Needed for Army Service

The physician, like every other American, has become actively interested in our national security and stands ready to contribute his services as required for military preparedness.

The immediate problem in this connection is one that concerns the War Department, and primarily the young physician. The War Department must procure sufficient additional personnel from the medical profession to augment the medical services of the Regular Army as the various increases are made in the strength of the Regular Army, as authorized by Congress to meet the partial emergency. The young physician is especially concerned because it is usually advantageous, and is often more convenient for him to serve with the Army.

Present plans of the War Department are designed to make service attractive and instructive for the young physician. If the physician holds a Medical Corps Reserve commission he can be ordered to active duty if he so requests. If he does not hold a commission, but is under 35 years of age and is a comparatively recent graduate of an accredited school, he may secure an appointment in the Medical Corps Reserve for the purpose of obtaining extended active duty for a period of one year or longer. Duty is given at General Hospitals, Station Hospitals, and with Tactical Units, and embraces all fields of general and specialized medicine and surgery. Excellent postgraduate training is obtainable in connection with Aviation Medicine. After serving six months of active duty in the continental United States, a Reserve officer may request duty in Hawaii, Panama, or other United States territories and possessions. The initial period for duty is for one year and yearly extensions are obtainable thereafter until the international situation becomes more clarified and our domestic military program becomes stabilized.

Many young doctors who have served with the Army on extended active duty have taken the competitive examination for entrance into the Medical Corps of the Regular Army. Extended active duty affords an excellent opportunity for the physician to observe modern military medicine and the facilities that exist for a complete and comprehensive medical practice.

Pay is according to rank, and, including subsistence and quarters allowances for an officer with dependents, amounts to an annual sum of $3,905 for a Captain and $3,152 for a First Lieutenant; or, without dependents, to an annual sum of $3,450 for a Captain and $2,696 for a First Lieutenant. In addition, reimbursement is made for travel to duty station and return.

Further information may be obtained by writing to The Surgeon General, U. S. Army, Washington, D. C.

MEDICAL BROADCAST FOR SEPTEMBER

The Minnesota State Medical Association broadcasts weekly at 11:00 o'clock every Saturday morning over Station WCCO, Minneapolis; Station WLB, University of Minnesota; and KDAL, Duluth.

Speaker, William A. O'Brien, M.D., Professor of Preventive Medicine and Public Health, Medical School, University of Minnesota.

The program for the month will be as follows:

September 7—Cause of Home Accidents
September 14—Prevention of Home Accidents
September 21—First Aid in the Home
September 28—Injury of the Teeth

AMERICAN PUBLIC HEALTH ASSOCIATION

The sixty-ninth annual meeting of the American Public Health Association will be held in Detroit, Michigan, October 8 to 11, inclusive, at the Book-Cadillac Hotel. Approximately 3,500 health officials are expected to attend. A number of allied associations will meet at the same time and place.

Dr. Reginald M. Atwater is executive secretary. He has offices at 50 West 50th Street in New York City.

INTERNATIONAL ASSEMBLY—INTERSTATE POSTGRADUATE MEDICAL ASSOCIATION OF NORTH AMERICA

This year's assembly will be held in spite of foreign war and the political campaign at home, in the Public Auditorium, Cleveland, Ohio, October 14 to 18.

Members of the Ohio State Association and the Cuyahoga County Medical Society and of the Academy of Medicine of Cleveland are hosts to the Assembly and extend a cordial invitation to all members of the profession in good standing. Physicians are urged to bring their ladies, for whom entertainment is being arranged.

Morning, afternoon and evening sessions for five days will be filled by some eighty outstanding teachers from all over the country. The Saturdays preceding and following the Assembly will be devoted to clinics in the Cleveland hospitals. Excellent scientific and commercial exhibits will contribute an important part of the meeting.

This year, Dr. Chevalier Jackson, Philadelphia, is President; Dr. George W. Crile, Cleveland, Chairman of the Program Committee and Dr. William B. Peck, Freeport, Illinois, continues as Managing Director.

The annual dinner will be held October 16 with Dr. Chevalier Jackson as Master of Ceremonies. Addresses will be given by Dr. Ross T. McIntire, Surgeon-General, United States Navy, and Dr. Nathan B. Van Etten, President of the American Medical Association.

On page xxiii of the advertising section of this issue appears a list of clinicians who will take part in the scientific program, and further information regarding the meeting.

CLASSROOM RADIO HEALTH TALKS

A series of classroom radio health talks to be given by Dr. William A. O'Brien, professor of preventive medicine and public health at the University of Minnesota, is announced.

The talks, to be broadcast over the University station WLB, will be given each Wednesday from 11:05 to 11:20 a. m., beginning September 25 and continuing through January 15. Physicians are urged to call the attention of their school superintendents to these classroom broadcasts designed for pupils of grades six through nine. The program is endorsed by the Minnesota State Medical Association and the Minnesota Public Health Association.

The schedule for the lecture series, known as "Your Health and You," follows:

September 25—Health Ideas and Practices
October 2—Foods We Eat
October 9—Nutrition of Body
October 16—Weight and Health
October 23—Mind and Body
October 30—Rest and Sleep
November 6—Feet and Posture
November 13—Play, The Business of Childhood
November 20—Cleanliness and Godliness
November 27—Air and Sun
December 4—Eyes and Ears
December 11—Mouth, Gateway to Health
December 18—Fads and Fallacies
January 8—Prevention Versus Cure
January 15—Community Health

SCHOOL OF NURSING AT HAMLINE UNIVERSITY

Hamline University and Asbury Hospital of Minneapolis have announced the establishment of a School of Nursing offering a five-year curriculum leading to the degree of Bachelor of Science in Nursing. The first class will be admitted in September, 1940.

The combined resources of Hamline University and Asbury Hospital will be used to provide a course of training that will equip young women of superior qualifications to meet the professional needs of the community and to derive high personal satisfaction from their lives in general and their profession in particular. Preference will be given to those applicants who rank in the upper third of their high school graduating class and whose personality and character traits specially fit them for the field of nursing.

The first three semesters of the course will be taken on the campus of Hamline University. The next five semesters will be taken at Asbury Hospital and affiliated institutions. The last two semesters will be taken at Hamline University. Upon the satisfactory completion of the entire course, students will be awarded the degree of Bachelor of Science in Nursing.

AMERICAN SOCIETY FOR THE CONTROL OF CANCER

The American Society for the Control of Cancer, 350 Madison Avenue, New York City, will furnish without charge copies of the following pamphlets upon request. While these pamphlets have in the past been sold and some appeared several years ago, they contain valuable information and are being given away for the good of the cause.

The pamphlets available are:

No. 40.—*Cancer of the Breast*, by Arthur H. Estabrook, Ph.D.—an eight page reprint from the "Trained Nurse and Hospital Review," Jan., 1939, with photographs showing steps in the radical surgical operation for breast cancer.

Re. 1.—*Biopsy in Mammary Cancer*, by James Ewing, M.D.—two page reprint from the *Bulletin* of the American Society for the Control of Cancer, Jan. 1933. A plea for proper methods of biopsy.

Re. 4.—*The doctor's Practical Relation to the Cancer Problem*, by William Carpenter MacCarty, M.D.—a five page reprint from the *Bulletin* of the American Society for the Control of Cancer, May, 1933. Points on prognosis.

Re. 6.—*The Responsibility of the Practitioner in Menopausal Bleeding*, by James E. King, M.D.—three page reprint from the *Bulletin* of the A.S.C.C., July, 1932.

Re. 7.—*Early Diagnosis of Carcinoma of the Cervix*, by Dr. Henry Schmitz—three page reprint from the *Bulletin* of the A.S.C.C., June, 1933.

Re. 8.—*The Family Physician's Place in the Control of Cancer of the Uterus*, by S. W. Cathcart, M.D.—three page reprint from the *Bulletin* of the A.S.C.C., Nov., 1933.

2018.—*Transillumination of the Breast*, by Max Cutler, M.D.—16 page reprint, 1933. On the use of transillumination as a confirmatory aid in diagnosis.

2019.—*Cancer of the Breast*, by Grantley W. Taylor, M.D., F.A.C.S., reprinted from the *International Abstract of Surgery*, July, 1932. Prepared at the request of the Comm. on the Treatment of Malignant Diseases, Amer. Coll. of Surgeons. 24 pages. Review of methods of diagnosis, treatment and results. Bibliography.

2020.—*Collective Review of the Recent Literature on Malignant Tumors of the Uterus*, by George H. Gardner, M.D., F.A.C.S., and George C. Finola, M.D. Reprinted from *Surgery, Gynecology, and Obstetrics*, Jan., 1934. 24 pages. Review of Methods of Treatment and Results. Bibliography.

2021.—*Radiosensitivity of Tumors*, by Fred W. Stewart, M.D., reprinted with additions from the *Archives of Surgery*. Dec., 1933. 88 pages. A technical presentation of special interest to radiologists.

2024.—*Cancer of the Stomach* by Howard K. Grey, M.D., and Donald C. Balfour, M.D., reprinted from the *American Journal of Cancer*, Oct., 1934. 28 pages. A technical presentation with bibliography.

SOUTHERN MINNESOTA MEDICAL ASSOCIATION

The Southern Minnesota Medical Association will hold a one-day meeting in Red Wing, September 23. The day's program of talks will be climaxed with a banquet.

The complete program follows:

Morning Session—9:00 A.M.

"The Use of Peridural Anesthesia for Office Procedure"—L. I. YOUNGER, M.D., Winona
"Seminal Vesiculitis"—R. F. HEDIN, M.D., Red Wing
"Recent Advances in Treatment of Common Skin Diseases"—L. A. BRUNSTING, M.D., Rochester
"Incisional Hernia and Methods of Repair"—A. E. BENJAMIN, M.D., Minneapolis
"Brucellosis"—I. FISHER, M.D., Ceylon
"Diagnosis of Pancreatic Disease"—M. W. COMFORT, M.D., Rochester
"The Effect of Digitalis on the Coronary Blood Flow"—R. V. SHERMAN, M.D., Red Wing
"Pathology in the Bronchi and the Esophagus: A Clinical and Endoscopic Study of Recent Cases"—V. J. SCHWARTZ, M.D., Minneapolis
"Diagnosis and Surgical Treatment of Diaphragmatic Hernia" (Motion picture)—S. W. HARRINGTON, M.D., Rochester

Afternoon Session—2:00 P.M.

Case Reports

"Carcinoma of the Stomach"—J. T. PRIESTLEY, M.D., Rochester
"The Diagnosis and Treatment of Pneumonia by the General Practitioner in Rural Districts"—R. V. WILLIAMS, M.D., Rushford
"Evaluation of Sulfathiazole in the Treatment of Human Disease"—WESLEY SPINK, M.D., Minneapolis
"Practical Suggestions Regarding Use of Protamine Insulin"—E. H. RYNEARSON, M.D., Rochester
"Fractures of the Tibia"—E. H. JUERS, M.D., Red Wing
"Organization of the Draft Boards for National Emergency"—LT. COL. H. E. HULLSIEK, M.D., Saint Paul

Evening Session—6:30 P.M.

Banquet

"Minnesota Medical Association: Its Activities and Aims"—B. S. ADAMS, M.D., Hibbing
"State Board of Health Problems"—T. B. MAGATH, M.D., Rochester
Presidential Address—JAMES MORROW, M.D., Austin

MISSISSIPPI VALLEY CONFERENCE ON TUBERCULOSIS and MISSISSIPPI VALLEY SANATORIUM ASSOCIATION

An invitation is extended to all physicians to attend the twenty-seventh annual meeting of the Mississippi Valley Conference on Tuberculosis and the Mississippi Valley Sanatorium Association, which will meet at the Lowry Hotel in Saint Paul, October 2, 3 and 4.

The Mississippi Valley Conference is composed of lay and medical members active in the anti-tuberculosis work of the local and state Christmas Seal organizations in Illinois, Indiana, Kansas, Michigan, Minnesota, Iowa, Missouri, Nebraska, North Dakota, Ohio, South Dakota and Wisconsin. Minnesota is represented on the Conference Council by the following physicians: Drs. Lewis S. Jordan, Granite Falls; Walter J. Marcley, Duluth; E. S. Mariette, Oak Terrace; E. A. Meyerding, Saint Paul; and J. A. Myers, Minneapolis.

Governor Harold E. Stassen will be the principal speaker at the dinner meeting on Thursday, October 3. His subject will be "Social and Economic Problems in the Decade Ahead." Dr. Everett K. Geer, first vice president of the Ramsey County Public Health Association, will give the address of welcome.

The annual meeting of the Minnesota Public Health Association, one of the affiliated organizations, will be held Thursday noon, October 3.

An interesting feature of the scientific exhibits will be the Leitz projector, which enlarges an x-ray film to full motion picture screen size. The projector is the only one of its kind in the United States. A special x-ray conference is scheduled for Friday night under the direction of Dr. John H. Skavlem of Cincinnati, Ohio.

Speakers at a College Hygiene luncheon scheduled for Friday noon will include the following physicians:

Dr. Ruth E. Boynton of Minneapolis, president of the American Student Health Association; Dr. J. A. Myers, Professor of Preventive Medicine at the University of Minnesota; Dr. Charles E. Lyght of Northfield, chairman of the Tuberculosis Committee, American Student Health Association.

Dr. Paul A. Teschner of Chicago, Assistant Director of the Bureau of Health Education of the American Medical Association, will preside at a panel Friday afternoon, October 4, on "Nursing Problems in a Sanatorium." Physicians taking part in the panel are: Dr. M. H. Draper, Secretary and Medical Director, Irene Byron Sanatorium, Fort Wayne, Indiana; Dr. J. Vincent Sherwood, Superintendent and Medical Director, South Dakota State Sanatorium, Sanator, South Dakota; and Dr. John W. Towey, Superintendent and Medical Director, Pinecrest Sanatorium, Powers, Michigan.

Joint meetings of the Mississippi Valley Conference on Tuberculosis and the Mississippi Valley Sanatorium Association are scheduled for Thursday, October 3. Separate meetings will be held Friday, October 4. The medical session program are as follows:

JOINT MEETING

Thursday, October 3, 1940

Morning Session

Presiding: THEODORE J. WERLE, Executive Secretary, Michigan Tuberculosis Association

1. **"A nation-wide survey on food handlers and infections"**
   JOHN S. KRUGLICK, M.D., Assistant Medical Director, Tuberculosis Institute of Chicago and Cook County, Chicago, Illinois.
2. **"Silico-Tuberculosis in Missouri"**
   Under the co-authorship of WILLIAM M. KINNEY, M.D., and JESSE E. DOUGLAS, M.D., Superintendent, Jasper County Tuberculosis Hospital, Webb City, Missouri.
3. **"Industrial clinic examinations (of iron mining employees)"**
   GEORGE McL.WALDIE, M.D., Director, Department of Industrial Health, the Cleveland Cliffs Iron Company, Ishpeming Hospital, Ishpeming, Michigan.
4. **Industrial Problems**
   RICHARD D. MUDD, M.D., Medical Director, Chevrolet-Grey Iron Foundry, Division of General Motors Corporation, Saginaw, Michigan.

Minnesota Public Health Association Annual Meeting
Luncheon, 12:15, Grand Ballroom.

Afternoon Session

Presiding: A. T. LAIRD, M.D., Superintendent, Nopeming Sanatorium, Nopeming, Michigan

1. **"Examination of the lungs in recruits"**
   J. D. ADAMSON, M.D., Winnipeg, Canada
2. **"Symposium of choice of x-ray films in tuberculosis work"**
   "The 4x5 film in Case Finding"—C. C. BIRKELO, M.D., and B. H. DOUGLAS, M.D., Detroit
   "The Relative Usefulness of 35 mm. Films in Case Finding"—D. O. N. LINDBERG, M.D., Decatur, Illinois
   "The Comparative Value of Chest Roentgenograms made on Films and on Paper"—S. REID WARREN, JR., Moore School of Engineering, Philadelphia
3. **General Discussion.**

MISSISSIPPI VALLEY CONFERENCE ON TUBERCULOSIS

Friday, October 4, 1940

Morning Session

Presiding: DONALD E. PRATT, Executive Secretary, Missouri Tuberculosis Association, St. Louis, Missouri

1. **"Mass testing in rural areas in Manitoba"**
   EDWARD L. ROSS, M.D., Medical Superintendent, Manitoba Sanatorium Board, Winnipeg, Canada.
2. **"Case finding by joint official and non-official coöperation"**
   C. K. MCCARTHY, M.D., Director, Division of Tuberculosis, Iowa State Department of Health, Director, Cooperative Case-Finding Service, Iowa Tuberculosis Association.
3. **"Care of the discharged tuberculosis patient"**
   W. J. BRYAN, M.D., Superintendent and Medical Director, Rockford Municipal Tuberculosis Sanatorium, Rockford, Illinois.
   MISS METTA BEAN, Director, Social Service Department, Wisconsin Anti-Tuberculosis Association, Milwaukee, Wisconsin.
   MISS PEARLE J. HELD, Superintendent, Sarahurst Boarding Club, Minneapolis.
4. **"Institutional surveys"**
5. **"A recapitulation of surveys as they affect the local tuberculosis association"**
   R. G. PATERSON, M.D., Executive Secretary, Ohio Tuberculosis Association, Columbus, Ohio.

MISSISSIPPI VALLEY SANATORIUM ASSOCIATION

Friday, October 4, 1940

Morning Session

Presiding: HAROLD M. CONN, M.D., Superintendent, Wisconsin State Sanatorium, Statesan, Wisconsin

1. **"The detection of tubercle bacilli in latent lesions and in normal tissues of the human lung"**
   WM. H. FELDMAN, D.V.M., and ARCHIE H. BAGGENSTOSS, M.D., The Mayo Foundation and Clinic, Rochester, Minnesota.
2. **"The dissemination of tubercle bacilli in the human spleen and liver."**
   C. E. WOODRUFF, M.D., and RUBY G. KELLY, Wm. H. Maybury Sanatorium, Northville, Michigan.
3. **"Roentgenological-Pathological Conference"**
   HENRY C. SWEANY, M.D., Medical Director of Research, Municipal Tuberculosis Sanatorium, Chicago, Illinois.

Afternoon Session

Presiding: JOHN B. BARNWELL, M.D., Associate Professor of Medicine, University of Michigan, Ann Arbor, Michigan

1. **"The treatment of syphilis in tuberculous patients"**
   PAUL MURPHY, M.D., and LEON BRAMBURG, M.D., Robert Koch Hospital, St. Louis, Mo.
2. **"Pulmonary carcinoma"**
   EDWIN J. SIMONS, Swansville, Minn.
3. **Business meeting**
4. **"Tuberculosis in public institutions"**
   H. E. HILLEBOE, M.D., Director of Tuberculosis, Minnesota State Board of Control, Saint Paul, Minn.
5. **"Intrapleural pneumonolysis"**
   Experiences with this Procedure at Nopeming Sanatorium —G. A. HEDBERG, M.D., Nopeming Sanatorium, Nopeming, Minn.

"SULFATHIAZOLE" AND "SULFAMETHYLTHIAZOLE"

The Council on Pharmacy and Chemistry reports that the terms "sulfathiazole" and "sulfamethylthiazole" are acceptable to Dr. Fosbinder, who is credited as the discoverer of 2-sulfanilamidothiazole and 2-sulfanilamido-4-methylthiazole. Inquiry was also made of Dr. E. J. Crane, chairman of the Committee on Nomenclature of the American Chemical Society, who also informed the Council that, in his opinion, there was no objection to offer to these nonproprietary names. Accordingly, the Council adopted the recommendation of its Committee on Nomenclature that the terms "sulfathiazole" and "sulfamethylthiazole" be accepted as nonproprietary designations for 2-sulfanilamidothiazole and 2-sulfanilamido-4-methylthiazole, respectively. The adoption of these terms does not indicate at this time the acceptance of the substances. (J.A.M.A., June 15, 1940, p. 2387.)

TRANSACTIONS of the MINNEAPOLIS SURGICAL SOCIETY

Stated Meeting, Thursday, January 4, 1940

President, WILLARD D. WHITE, M.D., in the Chair
Secretary, HARVEY NELSON, M.D.

ABDOMINAL PAIN AND ILEUS DUE TO URETERAL CONSTRICTION

Report of Case

CHARLES E. MERKERT, M.D.
Minneapolis

The case that I am presenting is that of a boy who when he first came to me on December 18, 1935, was seven years old.

On his first visit, which was at the office, his mother told me that he had been having attacks of abdominal pain, accompanied by vomiting and fever for the past two years. She said he would have two to three attacks each year, each attack lasting two to four days and then he would be normal again. The present attack had started two days previous and had been accompanied by vomiting. His bowel movements had been normal. There was no urinary burning or frequency. Examination showed normal temperature and pulse. There was moderate rigidity of the abdominal muscles over the whole right side. Maximum tenderness of a moderate amount was just to the right of the navel. There was no abdominal distension. Leukocyte count was 12,000. Urine examination was normal. Three urine examinations over a period of three or four days were all negative. By this time his attack had completely subsided and he was without pain.

Then on June 7, 1936, he had another attack of abdominal pain and vomiting. I saw him early the next day and sent him to Northwestern Hospital. At this time his rigidity and muscle spasm was over the right lower quadrant. Maximum tenderness was just to the right of the navel. Temperature was 99.2; leukocyte count 9,000. A urine specimen examination was normal except for only an occasional pus cell in the centrifuged specimen.

Through a right rectus incision a limited abdominal exploration was done. The appendix was removed and was normal, except for some increase in the amount of lymphoid tissue. No Meckel's diverticulum or evidence of pathology was found.

Within a month following this operation, the patient again had another attack of pain and vomiting, and later that year he had about two more attacks. His mother on my advice, gave him an enema each time which seemed to abort the attacks. I did not see him during this time.

On December 6, 1936, he had an attack of pain all over the abdomen, but more so over the appendectomy scar. This was again accompanied by vomiting. The mother gave him an enema with good results. The next day he still had some pain but felt better in the evening and the vomiting stopped. The day following he had two good bowel movements, but late that night the pain became more severe and he began to vomit again. I saw him the next morning at which time his temperature was 101. His abdomen was doughy in consistency. There was generalized abdominal tenderness of a moderate degree. The patient was listless and looked very sick, which I believed was due to acidosis.

He was sent to the Hospital where on admission Dr. Edward Anderson, pediatrician, was called in consultation. He made a tentative diagnosis, of cyclic vomiting and advised treatment for acidosis by giving glucose and fluids. Hartman's solution was given by hyperdermoclysis. Glucose and saline solutions were given by vein and by proctoclysis. By the next day, December 10, 1936, he stopped vomiting and felt better.

Next day, December 11, he began to vomit again and a urine specimen revealed some acetone still in the urine. His abdomen became more distended and he had more abdominal pain. His temperature was 102 by rectum and he had a cough. Nasal suction was started and a flat plate of the abdomen was taken showing small bowel obstruction.

The next day the temperature went to 104 by rectum and he was coughing more. There were râles in the left lower chest. Although nasal suction at times seemed to work well, his abdomen remained markedly distended. Enemata of various types including milk and molasses produced some flatus but distension was not relieved. The nasal suction catheter was adjusted, using the x-ray, to determine the position of the tube but still decompression did not result. The patient was delirious at times.

The next morning which was December 13, Dr. Wangensteen was called in consultation and agreed that enterostomy should be done at once. By palpation and auscultation of the abdomen in which he heard borborygmi and tinkling sounds, he stated the obstruction to be of a dynamic rather than a paralytic type.

The patient was taken to the operating room after administration of chloral hydrate by rectum. Under local anesthesia, through a McBurney incision, an enterostomy was done on the first loop of small bowel that presented. This enterostomy was similar to a Witzel gastrostomy, using one catgut stitch to tack the No. 14 French catheter to the bowel wall and interrupted silk sutures to form the bowel peritoneal tunnel.

Bottle suction was applied to the enterostomy tube and this along with nasal suction rapidly decompressed the bowel. Intravenous fluids were increased in amount. A flat plate of the chest at this time revealed some pleural effusion with an atelectasis or pneumonia in the left lower chest. The patient improved and the day after operation passed some flatus. On the second day after operation he had a soft stool. From then on he rapidly improved and left the hospital on January 1, 1937.

On January 19, 1937, a gastro-intestinal x-ray was negative. However, one plate showed an absence of psoas muscle shadow on the right.

On February 11, 1937, an intravenous pyelogram showed a definite right hydronephrosis probably due to ureteral neck obstruction. I recommended cystoscopy followed by operation, but as he was feeling well and had no attacks his parents postponed more surgery at this time.

On July 26, 1938, he had another attack of pain and vomiting. He was immediately brought to the hospital. Dr. Ernest Meland was called in consultation. He inserted a catheter into the right ureter to the pelvis. Retrograde pyelogram showed again the hydronephrosis and also the narrowing of the uretero-pelvic juncture. Removal of the catheter caused recurrence of the pain. It was reinserted and after a few days of drainage, operation was performed.

Under ethylene anesthesia on August 4, 1938, the kidney was exposed. This exposure was difficult due to marked perinephritis. Uretero-pelvic adhesions bound the ureter high upon the pelvis. There was an anomalous artery about 4 mm. in diameter tight across the uretero-pelvic juncture. This artery was very sclerotic and nodular like those of an old man. The artery was clamped and cut. After freeing the ureteral neck

of adhesions it was so narrow that a Y plasty of the Schwyzer-Foley type was done. A few stitches in the kidney capsule were attached to the fascia as nephropexy to place the kidney in a normal position and the wound was closed. A No. 20 catheter had been placed through the kidney, to the pelvis as drainage and a No. 5 ureteral catheter through the kidney, the pelvis and into the ureter to act as a splint.

Except for some urinary infection before and just after leaving the hospital, which responded well to sulfanilamide therapy his recovery was uneventful.

Two months later, on October 28, 1938, intravenous pyelogram showed good function of the kidney but some remaining dilatation of the kidney pelvis.

Last Saturday, December 30, 1939, another intravenous pyelogram again showed good function and the pelvis about the same size.

It is now one year and four months since his operation and during that time has had no pain or vomiting. He has been in excellent health since that time.

The few observations I wish to make are these:

1. With repeated abdominal pain and vomiting in children even in the presence of normal urine, an intravenous pyelogram should be done for diagnosis.
2. Ureteral obstruction in children can produce an ileus either of the paralytic or dynamic type.
3. Y plasty of the uretero-pelvic junction may be necessary even after excision of an obstructing anomalous artery.
4. An anomalous artery under tension may be very sclerotic even in a child.

FRACTURE OF THE SPINE OF THE TIBIA (INTERCONDYLOID EMINENCE)

ERNEST R. ANDERSON, M.D.
Minneapolis

The authors of textbooks on surgery and on fractures are not in agreement as to the treatment and management of fractures of the tibial spine. The condition is dismissed by some as being very simple and others consider it to be a very important fracture because of the possibility of creating a permanent state of disturbed physiology of the knee joint. If an accurate knowledge of the anatomy and a true understanding of the physiology of the knee joint is possessed, an exact diagnosis can be made and rational treatment carried out.

Fracture of the tibial spine was first described by Poncet[19] in 1875. It was a postmortem finding in an individual who died instantly following a fall from a third story window. Dittel,[19] the following year, had a case occurring in a man who had been thrown from a public house. The knee joint became distended with blood and following aspiration became septic. The leg was amputated and the patient died. On postmortem examination, a fractured tibial spine was found.

Goodlee,[19] in 1888, described a case that had occurred in 1873 in the wards of the University College Hospital, London. The specimen was an autopsy finding and had been preserved in the museum of the University College Hospital. Roth,[19] in presenting this subject to the British Orthopedic Association in 1927, demonstrated this specimen.

The condition occurring in a living subject was first described by Pringle[18] in 1907.

The patient, a male aged thirty-six, was injured June 11, 1903, by a severe blow on the outer aspect of the left knee joint. He was knocked down, the left knee being forced inward. He was admitted to the Royal Infirmary, Glasgow, on June 14. The left knee was greatly swollen by the effusion in the joint cavity. The left leg was abnormally abducted at the knee joint. No x-rays were taken of the knee. It was thought that the internal lateral ligament of the left knee was ruptured. No mention was made as to whether extension of the left leg was blocked or not. There was no abnormal anteroposterior movement of the tibia on the femur.

The internal lateral ligament of the knee was exposed on June 26, 1903, and found to be intact. The knee joint was opened and a fracture of the spine of the tibia found. Pringle replaced the fractured tibial spine and sutured it into place.

Following is a report of a case of comminuted fracture of the left tibial spine which was treated in a conservative or non-operative manner producing a very satisfactory result.

A white male, aged twenty-four, while playing basket ball on March 22, 1939, made a sudden stop. He fell forward. In falling the left leg was twisted inward as well as forced medially. He landed with the left leg underneath him. At the time he heard a snap in the left knee. The knee and leg felt numb at first. He was helped to his feet and when he stepped on the left foot the left leg did not support him. He had no pain in the left knee or leg until the knee was moved.

On examination the left knee joint was found to be swollen and fluctuation was present. The left leg was abducted 7 degrees. The leg could passively be completely extended and could be flexed to 90 degrees. There was no abnormal posterior or anterior movement of the tibia on the femur. He had tenderness on the lateral surface of the knee over the interarticular space and over the lateral femoral condyle.

An x-ray of the left knee was taken by Dr. A. G. Allison and a comminuted fracture of both tubercles of the left tibial spine was found. There was a slight displacement of the fragment of the medial tubercle of the tibial spine. X-rays were taken with the knee flexed, these showing the comminuted fracture and an increase in the displacement of the medial tubercle of the tibial spine.

The patient was sent to Asbury Hospital and kept in bed. The knee joint was aspirated daily, 70 c.c., 40 c.c., 23 c.c. and 24 c.c. of bloody fluid were removed on successive days. With the leg completely extended a compression bandage was applied to the knee after each aspiration. On the sixth day following the injury a walking cast was applied from the gluteal fold to the toes on the left leg. The following day he was allowed to walk on the injured leg and discharged from the hospital.

The cast was removed on May 8, 1939. The x-rays taken at that time showed bony union of the lateral tubercle of the tibial spine which was in good position. The fracture line of the medial tubercle of the tibial spine was clearly seen and there was some increase in the density of this fractured fragment with no evidence of union.

The left knee was supported by an Ace bandage and he was instructed to use the left leg. On June 7, 1939, he was walking without support. He had no pain in the left leg or knee and stated that the leg felt strong. The left leg extended at the knee to 180 degrees and flexed so that the posterior surfaces of the leg and thigh came together. There was no relaxation of the ligaments of the knee joint. He returned to work on June 30, 1939.

When he was seen on July 8, 1939, he stated that

he had a sense of confidence in the knee and was able to work his eight-hour shift without having any pain. At this time the motions of the left knee were normal. There was no anterior or posterior movement of the tibia on the femur.

Fracture of the tibial spine does not occur frequently. It is usually associated with other fractures involving the knee joint. The incidence of unassociated fracture of the tibial spine, as reported by different authors, varies.

Swett, McPherson and Pike[22] had ten cases of this type included in their study of forty cases of tibial fractures involving the knee joint. Cullovich[22] reported three cases occurring in twenty-four fractures of the tibia involving the knee joint. Steuer's[21] incidence was one case in sixteen. In 5,840 consecutive recent fractures, Clarke[3] observed twelve cases in thirty-two tibial fractures involving the knee joint. Kurlander[10] reported three cases in 1,000 fracture cases. In the Massachusetts General Hospital, Barr[1] observed four cases among a total of 4,390 fracture cases.

It is interesting to note that in Swett, McPherson and Pike's[23] study seven of their cases occurred in connection with automobile accidents. They did not mention how many of their fractures were the result of direct blows or twisting injuries. Barr[1] had one case where the fracture was due to a blow in the region of the knee, the remaining three cases being caused by a twisting injury to the knee joint.

To understand this fracture a consideration of the anatomy of the head of the tibia is necessary. The proximal end of the tibia is composed of two articulating surfaces, the medial and lateral condyles. These condyles are separated by a roughened nonarticulating area. The raised portion in the center of this area is the tibial spine or intercondyloid eminence. Situated on the tibial spine are two tubercles: the medial, sometimes referred to as the anterior; and the lateral, which is sometimes called posterior.

Anterior and posterior to the tibial spine there are two flattened surfaces known as the anterior and posterior intercondyloid fossæ. On the anterior intercondyloid fossa are attached the anterior extremities of the medial meniscus, the anterior crucial ligament and the anterior extremity of the lateral meniscus.

The tibial attachment of the anterior crucial ligament is described differently by the various anatomists. Spalteholz's Atlas[20] states that the attachment is especially on the medial intercondyloid tubercle of the tibial spine, and on the anterior intercondyloid tibial fossa between the anterior points of the fastening of the two menisci.

The anterior crucial ligament is described in Morris' Human Anatomy[15] as being attached to the medial half of the fossa in front of the intercondylar eminence of the tibia and to the lateral border of the medial articular facet as far back as the medial intercondyloid tubercle. It is fixed to the tibia behind the anterior extremity of the medial semilunar meniscus. Behind and to the lateral side it has the anterior extremity of the lateral meniscus, a few fibers of which blend with the lateral edge of the ligament. Its anterior fibers at the tibial end are strongest and longest, being fixed highest on the femur; while the posterior, springing from the intercondyloid eminence, are shorter and more oblique. In Cunningham's Anatomy[4] the anterior cruciate ligament is said to be attached in the rough nonarticulating area in front of the intercondyloid eminence of the tibia. The anterior crucial ligament arises from the depression in front of the spine of the tibia, according to Piersol's Human Anatomy.[11]

Parsons[16] having made a thorough study of the head of the tibia states, "The tibial attachment of the anterior crucial ligament is indicated by a little knob on the outer margin of the internal articular facet. From this the attachment runs transversely outward to about the mid-sagittal line of the tibial head." He describes the medial tubercle of the tibial spine as being free and the anterior crucial ligament as resting against it as it passes backward, upward and laterally from its attachment on the anterior intercondyloid fossa to its attachment on the medial side of the external femoral condyle.

Through the courtesy of Drs. C. M. Jackson and E. A. Boyden of the anatomy department of the University of Minnesota, I dissected and examined sixteen cadaver knee joints. The tibial spine was well defined in all specimens. The medial and lateral tubercles with the intertuberculum sulcus were clearly demarcated.

The tibial attachment of the anterior crucial ligament was found to be a fan shaped area on the anterior intercondyloid fossa along the lateral margin of the medial tibial condyle. The anterior margin of the tibial attachment was consistently about three-fourths of the distance from the tibial spine to the anterior margin of the tibial head. Laterally the margin was usually beyond the mid-sagittal line.

In nine specimens the posterior fibers of the anterior crucial ligament ended on the anterior intercondyloid fossa in front of the base of the medial tubercle. The medial tubercle was free of any attachment. In five specimens the posterior fibers of the anterior crucial ligament fastened to the anterior surface of the medial tubercle. These fibers were not dense and were easily detached. They were not joined firmly with the integral portion of the ligament. In two specimens the posterior fibers of the anterior crucial ligaments were attached along the lateral side of the medial tubercle. The attachment extended backward to the level of the posterior portion of the tubercle. To the anterior intercondyloid fossa were attached the long, dense, strong fibers of the ligament. The fibers that attached to the lateral side of the spine were shorter and angulated from the long axis of the ligament.

In all the specimens dissected the lateral tubercle of the spine was free and had no attachments of any intra-articular structure.

The mechanics for the production of fracture of the tibial spine is one of direct trauma by the condyle or condyles of the femur on the structure. This fracture occurs when the foot is fixed and the femur is forcefully rotated on the tibia, or when the knee is forced medially or laterally, or it could be a combina-

tion of both. In some instances the rotation of the femur on the tibia is the predominant force; while in others the forcing of the femur on the tibia, either in the medial or lateral direction, is the causative force. In forced rotation of the femur the lateral margin of the internal femoral condyle strikes the medial tubercle of the tibial spine and the medial margin of the lateral condyle strikes the lateral tubercle. By the shearing force one or both tubercles of the tibial spine is broken. When a direct force is applied above the interarticular space to the lateral side of the knee, the medial margin of the lateral femoral condyle strikes the lateral tubercle of the tibial spine and fractures it. If the force is sufficient to cause a dislocation of the knee the medial tubercle can also be fractured. With the force directed above the interarticular space against the medial side of the knee, the medial tubercle is struck by the lateral margin of the medial femoral condyle and fractured. The lateral tubercle will be fractured if the force is sufficient to dislocate the knee so that the medial condyle strikes it.

The shearing force as the causative factor in producing tibial spine fractures was recognized by Jones and Smith[7] as well as an avulsive force produced by the anterior crucial ligament. Webb,[24] in describing this fracture in Christopher's Surgery, states that the etiologic factor is the striking of the femoral condyles against the tubercles. Fairbanks,[5] in discussing this subject before the orthopedic section of the Royal Society of Medicine, differentiated between the true fracture of the tibial spine that resulted from the shearing force, and the fracture caused by the pull of the anterior crucial ligament which produced an avulsion of bone from the tibia in front of the tibial spine in the anterior intercondyloid fossa.

The force that produces this avulsion of bone must be exerted to the tibial attachment of the anterior crucial ligament. The ligament is taut when the knee is extended. The avulsive force is created on hyperextension of the knee. When the knee is in any degree of flexion the anterior crucial ligament relaxes and no avulsive force can be exerted. In view of the fact that the firm tibial attachment of the anterior crucial ligament is not on the tibial spine but on the anterior inercondyloid fossa, the fracture produced on hyperextending the knee is the portion of the fossa in front of the tibial spine. In the case herein reported the fractured medial tubercle of the tibial spine was displaced more when the knee was flexed, that is, when the anterior crucial ligament was relaxed. In extension or hyperextension of the knee the anterior crucial ligament becomes taut and presses down on the medial tubercle exerting a force to replace it. In the case of an avulsive fracture in the tibial attachment of the anterior crucial ligament, extension or hyperextension of the knee causes a pull on the fractured fragment and displaces it from the head of the tibia. Lee[12] recognized this fracture and describes his technic for the operative reduction in a paper titled, "Avulsion Fractures of the Tibial Attachments of the Crucial Ligaments."

In knee injuries, a fracture of the tibial spine should be suspected when a rapid distention of the knee joint occurs with the knee held in partial flexion. The distention occurs early and is marked, this being caused by the filling of the joint cavity with blood. Active and passive motions of the knee and weight bearing are painful. The fragments of the fractured tibial spine are in the intercondyloid area and will usually not block the motions of the knee joint. Along with these signs are those resulting from the injury of the collateral ligaments of the knee: namely, tenderness over their attachments; palpation of a depression over the interarticular space if the ligaments are torn; and some degree of abduction of the leg depending on the extent to which collateral ligaments of the knee are injured.

If the tibia can be moved forward on the distal end of the femur while the knee is flexed either at the time of injury or when the knee joint has been aspirated, it speaks for injury involving the anterior crucial ligament. Roentgenographic study will determine if an avulsion fracture of the tibial attachment of the ligament has occurred.

True fractures of the tibial spine are treated conservatively except when the fragments are displaced into the interarticular portion of the joint and cause interference. In that case the fragment acts as a foreign body in the joint and must be removed surgically if manipulation with the knee in flexion does not dislodge the separated portion of the tibial spine. Otherwise, after the knee-joint distention has been controlled by repeated aspirations, the knee is immobolized in complete extension in a plaster-of-Paris cast. With the knee extended, early weight bearing can be employed. The knee should be immobilized for six to eight weeks to allow firm bony union. The injured collateral ligaments of the knee will heal and be solid at the end of the immobilization.

In the case of the avulsion fracture of the tibial attachment of the anterior crucial ligament, reduction should be operative. The fractured tibial fragment should be replaced in the anterior intercondyloid fossa and fixed. This is important because, if the anterior extremity is not anchored, the integrity of the crucial ligament is disturbed and the result is an unstable knee joint. After the operative reduction, the knee joint is immobilized in a plaster-of-Paris cast with the knee partially flexed to relax the anterior crucial ligament. Immobilization should be maintained until firm union of the fracture is obtained.

Summary

1. A case of fracture of the tibial spine is reported.

2. A satisfactory functional and anatomical result was obtained by conservative treatment.

3. The firm tibial attachment of the anterior crucial ligament was found to be in the anterior intercondyloid fossa in sixteen dissected anatomical specimens.

4. Fracture of the tibial spine and avulsion fracture of the tibial attachment of the anterior crucial ligament are separate conditions and should be differentiated.

Bibliography

1. Barr, Joseph S.: Fractures of upper end of the tibia. In Wilson's Management of Fractures and Dislocations. Philadelphia: J. P. Lippincott Co., 1938, pp. 697-713.
2. Blaisdell, F. E.: Fracture of the tibial spine, an experimental study. Arch. Surg., 5:561-577, 1922.
3. Clarke, H. Osmond: Discussion on fracture of the tibia involving the knee joint. Proc. Roy. Soc. Med., 28:1035-1043, 1935.
4. Cunningham, D. F.: Textbook of Anatomy. ed. 7, New York; Oxford University Press, 1937, pp. 364-365.
5. Fairbank, H. A. T.: Discussion on fracture of the tibia involving the knee joint. Proc. Roy. Soc. Med., 28:1049-1050, 1935.
6. Fripp, A. T.: Discussion on fracture of the tibia involving the knee joint. Proc. Roy. Soc. Med., 28:1043-1047, 1935.
7. Jones, Robert and Smith, S. Alwyn: On rupture of the crucial ligaments of the knee and on fracture of the spine of the tibia. Brit. Jour. of Surg., 1:70-89, (July) 1913.
8. Fisher, A. G. Timbrell: Internal Derangement of the Knee Joint. ed. 2, New York: The Macmillan Co., 1933, pp. 168-172.
9. Key, J. A., and Conwell, H. E.: Fractures, Dislocations and Sprains. ed. 2, St. Louis: The C. V. Mosby Co., 1937, pp. 1044-1046.
10. Kurlander, Joseph J.: Fracture of the spine of the tibia. Jour. A.M.A., 77:855, 1921.
11. Lange, Sidney: Strain fractures of the knee. Ann. Surg., 48:117-121, 1908.
12. Lee, Harold G.: Avulsion fracture of the tibial attachment of the crucial ligaments. Jour. Bone and Joint Surg., 19:460-468, 1937.
13. Lewis, D.: Fracture of the spine of the tibia. Int. Clin. Vol. 2:67-69, 1918.
14. Moorhead, John J.: Knee joint injuries. Surg. Clinic No. Am., 1:1613, 1921.
15. Morris, Henry: Human Anatomy. ed. 9. Philadelphia; P. Blakiston's Son & Co., 1933, p. 356.
16. Parsons, F. G.: Observations on the head of the tibia. Jour. Anat. and Physiol., 41:83-87, 1906.
17. Piersol, G. A.: Human Anatomy. ed. 9. Philadelphia: J. B. Lippincott Co., 1930.
18. Pringle, J. Hogarth.: Avulsion of the spine of the tibia. Ann. Surg. 46:169-178, (Aug.) 1907.
19. Roth, P. B.: Fracture of the spine of the tibia. Jour. Bone and Joint Surg., 10:509-518, (July) 1918.
20. Spalteholz, W.: Hand-Atlas of Human Anatomy, translated by Lewellys F. Barker. ed. 7. Philadelphia: J. B. Lippincott Co., p. 224.
21. Steuer, Herbert S.: Fractures of the tibia involving the knee. Ann. Surg., 89:580-590, 1929.
22. Swett, P. P., McPherson, S. H. and Pike, M. M.: Fracture of the tibia into the knee joint. New Eng. Jour. Med., 204:749-756, 1931.
23. Venable, C. S.: Fracture of the tibial spine. Am. Jour. Surg., 24:478, 1934.
24. Webb, R. C.: Fracture of the tibia and fibula. In Christopher's Textbook of Surgery. ed. 2. Philadelphia: W. B. Saunders Co., 1939, p. 692.

ENTERIC INTUSSUSCEPTION IN AN ADULT
Report of a Case

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Intussusception is that condition in which a part of the bowel invaginates itself into an adjacent part. It has been recognized for centuries. The first real description of the condition was made by 16th Century anatomists.

The cause in many cases is unknown. Polyps and tumors, both benign and malignant, have set off the process. Acute appendicitis, Meckel's diverticulum, foreign bodies in the intestinal tract and acute inflammation have also been mentioned as causes. A radical change in diet may be responsible as in two cases reported by Moore.[4] They were observed during the Mohammedan fasting season when the Mohammedans do not eat or drink between sunrise and sunset. These individuals were seized with symptoms of intussusception at the end of the fast, one after drinking a glass of cold water, the other had taken nothing. Both died. At postmortem examination no cause could be found for the condition. Other cases have been reported in which the etiology could not be explained.

Most cases of intussusception are in infants under two years of age (80 per cent according to Montgomery).[7] It is more frequently found in boys than girls, especially in healthy robust boys. It is rare in adults, especially the types in which there is no apparent cause such as polyps or tumors. Davis[2] of Duluth, reviewed the records of St. Luke's and St. Mary's Hospitals of that city and found that in 113,351 patients, intussusception was present only twenty-two times. There was only one adult in this series. At the Beth-El Hospital, Brooklyn, New York, over an eleven-year period, there were six cases of intussusception in 62,682 admissions, and one of those was an adult. (Finkelstein)[4]

McGlannon[6] classifies intussusception into 3 groups: (1) enteric (10 per cent); (2) entero-colic (80 per cent); and (3) colic (10 per cent). Usually there is a single invagination. Occasionally, however, there may be a double or even a triple process. Very rarely the invagination may be retrograde. As the infolding process progresses the mesentery is pulled in and the venous blood supply is compromised. Swelling occurs and increases, blood extravasates into the bowel lumen, later the arterial blood is cut off and gangrene occurs. Peritonitis develops and if the process has been slow in forming, occasionally it is walled off, and an abscess may form or the invaginated portion of gut may slough off and pass from the rectum, an autoanastomosis taking place. However, by far the most frequent occurrence is a spreading peritonitis and death, unless surgical relief is obtained. Very rarely an intussusception will unfold itself.

The first symptom is sudden, severe pain in the abdomen as in partial intestinal obstruction. This is intermittent and paroxysmal until complete obstruction or peritonitis occurs. The cramps usually last a few minutes and then let up, only to return again in a short time. The pains are severe, causing the patient to double up. He may assume the knee-elbow position or pull the legs up, trying to obtain relief. The face shows a painful, agonized expression. When obstruction becomes complete, gangrene takes place and the pain is both paroxysmal and continuous. Vomiting usually occurs. The higher the lesion is located the earlier and more frequently vomiting is noted.

The bowels move normally early in the attack, but later no fecal material is passed. However, blood and mucus are usually expelled from the rectum in the entero-colic or colic type, or may be found on the examining finger. In the enteric type, blood is a late sign. The abdomen is not distended early but gradually becomes distended as obstruction becomes more pronounced. Auscultation reveals exaggerated peristaltic sounds until complete obstruction or peritonitis occurs; then there is the silent abdomen. The temperature is normal or subnormal early; later it increases. In the beginning of an attack the white blood count is also normal but as time goes on a leukocytosis is present. Palpation of the abdomen usually reveals tenderness and rigidity over the involved area. Under anesthesia

such as chloral hydrate, a tumor mass may be felt, most often sausage shaped and lying transversely across the abdomen. In many cases a mass may be felt on rectal examination which resembles the cervix uteri. The treatment is non-surgical and surgical. Good results are reported by Hipsley[3] of Australia from rectal injection of water or saline, but in this country, England and Europe, this method of treatment is thought to be dangerous.

If the lesion is less than a day old a barium enema may be given at low pressure and an attempt made to reduce the mass under fluoroscopic control. This is often successful in the colic or entero-colic types but if there is any doubt as to reduction the abdomen should be opened and this point determined. It is practically impossible to reduce the enteric type by rectal injections. Surgical treatment should be instituted as soon as the diagnosis is made in the enteric type and in the colic and entero-colic ones if the barium enema is unsuccessful.

A rectus incision over the point of tenderness should be made. The lesion is located and reduced by pushing the infolded intestine out. Very little if any traction should be put on the proximal intestine. In early cases reduction is usually easily accomplished. Later it may be difficult or impossible to reduce the intussusception. Warm saline compresses should be placed about damaged intestine and if its color and circulation return, it should be put back in the abdomen and the wound securely closed. If the reduction is impossible or the gut dead, we believe that it should be exteriorized as in the Mikulicz procedure.

In the May, 1939, issue of the *Journal-Lancet,* Dr. Philip A. Anderson and I reported a case of enteric intussusception in a boy four and a half years of age, because of its rarity. On November 26, 1939, Dr. Ralph H. Creighton and I[1] operated on a man fifty-two years of age with an enteric intussusception. Dr. Creighton will now report this case.

The patient, a man aged fifty-one, was seen Sunday evening, November 26, 1939, because of severe, periodic paroxysms of pain in the abdomen. The onset had been extremely sudden, about one hour before he was first seen. There had been nothing unusual about his condition or activities during the day, and the cramps started with no premonitory symptoms, shortly after returning home from an automobile ride. The spasms of pain were periodic, occuring every few minutes with complete relief and relaxation in between, and so severe that he would cry out and roll around in agony as soon as they started. He found some relief in assuming the knee-chest position, or sitting up in bed with his legs flexed tightly against his abdomen and his chin on his knees. His facial expression was agonized and apprehensive. His face was pale and beaded with perspiration. His skin was cold and clammy, almost presenting a picture of shock except for the fact that his pulse was not elevated. With each spasm of pain, there would be moderate nausea, and at times he would regurgitate small amounts of vomitus, always with relief. The vomiting was at no time projectile or fecal in character. There was no history, up to the onset of the present illness, of any gastro-intestinal disturbance, and no constipation. He knew of no foods which had ever given him any distress. The bowels had moved normally about eight hours previously, but since the pain started, there had been no gas passed nor any tenesmus of the rectum, with passage of mucus. The genito-urinary history was negative. He located the severest pain just below the umbilicus and a little to the left of the midline, although the entire abdomen was somewhat tender to palpation. There was no radiation of pain at all.

Physical examination revealed a subnormal temperature and a normal pulse. He was obviously in extreme pain during each paroxysm, and also quite comfortable and relaxed during the intervals. There was no distension of the abdomen. No masses were felt and there was no spasm of the recti muscles. The point of maximum tenderness was located to the left of the midline in the lower abdomen. Auscultation over the abdomen during pain, revealed sounds of active peristalsis, the gas giving a metallic, tinkling sound. Rectal examination revealed nothing, and there was no pain on Murphy percussion.

A tentative diagnosis of intestinal obstruction, due probably to volvulus, was made. At this time, intussusception was considered because the picture suggested that condition in an infant. This thought was discarded, because of the age of the patient, for the more reasonable assumption of volvulus.

On admission to the hospital, the temperature was found to be 96.4, the pulse 74, and respirations 24. Examination of the urine revealed nothing unusual. The leukocyte count was 9,400, with 83 per cent p.m.n.'s. A flat plate of the abdomen failed to show anything suggestive of obstruction, and gave no other leads to suggest a diagnosis.

Dr. William Jones was called in consultation, and the available evidence was considered. An acute inflammatory condition inside the abdomen was ruled out, but renal colic and diverticulitis were thought to be possiblities. It was agreed that we had no direct indication at that time for exploratory laparotomy. The patient was given ¼ gr. of morphine and observation was continued.

He passed an extremely uncomfortable night, although the cramps were not as severe, nor as frequent, as before. He had four or five emeses, although he took a fair quantity of fluids. The next morning, the leukocyte count had risen to 15,900, with 89 per cent p.m.n.'s. This brought an inflammatory condition back into the picture. A second flat plate of the abdomen revealed no more than the previous one had shown. The urine examination was again negative. There did not appear to be any change in the abdominal examination, and there was no distention. The barium enema was considered, and discarded because of the possible risk of rupturing an acutely inflamed diverticulum. Hot stupes were used during the day, but were discontinued because their weight caused discomfort. Two enemata were given without success. Little change occured throughout the day or night.

Tuesday morning, about thirty-eight hours after admission, his condition became as severe as on admission. The bouts of pain came on every few minutes, accompanied by vomiting of small amounts. The vomiting always seemed to bring relief. He again assumed the fetal position to relieve the pain, and now, for the first time, the abdomen began to be distended. No gas or feces had been passed since the onset. There was still no spasticity of the recti muscles, and no mass was felt. The temperature was still normal, but the pulse had risen to 120. The leukocyte count was 14,600, with 87 per cent p.m.n.'s. He looked much more ill than he had on the previous day. Intravenous administration of 5 per cent glucose in normal saline was started, and an immediate barium enema was ordered.

The barium was administered under fluoroscopic control, and passed all the way into the cecum, which was well filled. The colon was found to be entirely normal. Plates, however, showed a marked "laddering" of the small bowel and indicated a definite and marked ob-

struction of the lower ileum, distal to the cecum. Immediate laparotomy was advised and accepted.

A left rectus incision was made. As soon as the peritoneum was opened, a considerable amount of thin, chocolate colored fluid was found free in the peritoneal cavity. As soon as the peritoneal opening was completed, coils of small bowel pushed out of the opening, and an obvious intussusception reduced itself without manipulation. About three feet of mid-ileum was found to have been intussuscepted. The intussuscepiens was edematous, mahogony colored, and covered with petichiæ. The intussusceptum was pallid and ribbon flat. There was no evidence of any tumor or other mass in the lumen of the ileum, nor did there appear to be any other pathology present. Warm saline packs were used, and since the bowel appeared viable and no suggestion of mesenteric damage was present, the abdomen was closed.

Intravenous fluids were started on return to his room, and were continued until fluids were tolerated by mouth. He was given a total minimum of 3,000 c.c. in twenty-four hours. There was no postoperative distention at any time, and no vomiting. He started to pass gas by rectal tube the following morning. He needed very little sedation the first twenty-four hours, and none after that. On his second postoperative day he demanded food and cigarettes, it being Thanksgiving Day. An enema was given on the fourth day, with the passage of a large, soft formed stool. The remainder of his stay in the hospital was uneventful, and he was discharged on the eleventh day. There has been no trouble of any kind since.

Bibliography

1. Anderson, Philip and Jones, Wm. R.: Enteric intussusception. Journal-Lancet, 59:214, (May) 1939.
2. Davis, B. F.: Intussusception. Minn. Med., 19:455, (July) 1936.
3. Finkelstein, Ruben: Intussusception in the adult. Am. Jour. Digestive Dis. and Nutrit., 5:322, 1938-1939.
4. Hinton, J. William: Acute intussusception in adults during a fast. British Med. Jour., 1:319, (Feb. 23) 1924.
5. Hipsley, P. L.: The treatment of intussusception. Surgery, 1:825-837, (June) 1937.
6. McGlannan, Alexius: in Lewis' Practice of Surgery. Hagerstown, Md.: W. F. Prior Co., 2:17, 1932.
7. Montgomery, A. H.: in Brenneman's Practice of Pediatrics. Hagerstown, Md.: W. F. Prior Co., 3:131, 1937.

PADGETT'S DERMATOME AND SPLIT SKIN GRAFTS

H. O. McPheeters, M.D.
Minneapolis

Dr. H. O. McPheeters discussed skin grafts and the use of the Padgett Dermatome. After a discussion of the subject of skin grafts in general and the indications and uses of each particular type and thickness he demonstrated the Padgett Dermatome, an instrument for the taking of grafts of uniform thickness and of any thickness desired.

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He emphasized that the same precautions should be taken with the area to be grafted as with other methods. It is useless to place a graft over any area not prepared, not sterile, with sloughing tissue still present and with poor or not good granulations present. Following the placing of the graft it is imperative to hold it immobilized and with firm, steady pressure on it for about five days. This can be accomplished by the use of large sea sponges or a firm grade of rubber sponge placed over much fluffed gauze. The dressing and sponges should be moistened with normal saline every four hours.

WAR AND TUBERCULOSIS

War . . . makes pleasant news for the tubercle bacillus. As the deaths from T.N.T. increase, those from tuberculosis lag not far behind. In the World War all countries showed this phenomenon whether under arms or not. What effect on our efforts to eradicate tuberculosis will these grim months ahead bring forth? . . . Unless we find a way to redouble the offensive against our hidden enemy, the sad story of twenty years ago will be told again and we will find ourselves facing a record of lost ground.

—KENDALL EMERSON, M.D.

BOOK REVIEWS

Books listed here become the property of the Ramsey, Hennepin and St. Louis County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

BOOKS RECEIVED FOR REVIEW

NEOPLASTIC DISEASES. A Treatise on Tumors. Fourth Edition. James Ewing, A.M., M.D., Sc.D., LL.D., Professor of Oncology at Cornell University Medical School, New York; Consulting Pathologist, Memorial Hospital. 1160 pages. Illus. Price, $14.00, cloth. Philadelpia: W. B. Saunders Co., 1940.

MEDICAL NURSING. Edgar Hull, M.D., F.A.C.P. Clinical Professor of Medicine, Louisiana State University School of Medicine; Visiting Physician, Charity Hospital, New Orleans. Christine Wright, R.N., B.S. Graduate of Davis-Fischer Sanitarium, Atlanta, Ga.; Instructor of Nursing Arts, Charity Hospital School of Nursing, New Orleans; Public Health Nursing St. Mary Parish Health Unit and Experience Center, Franklyn, La. Ann B. Eyl, B.S., Assistant Dietitian, Cook County School of Nursing, Chicago; formerly Instructor in Home Economics, University of Kentucky; Therapeutic Dietitian Charity Hospital of Louisiana, New Orleans; Dietitian St. Vincent's Infirmary, Little Rock, Ark. 588 pages. Illus. Price, $3.50, cloth. Philadelphia: F. A. Davis Co., 1940.

SYNOPSIS OF THE PRINCIPLES OF SURGERY. Jacob K. Berman, A.B., M.D., F.A.C.S. Assistant Professor of Surgery, Indiana University School of Medicine, Indianapolis. 615 pages. Illus. Price, $5.00, flexible binding. St. Louis: C. V. Mosby Co., 1940.

CLINICAL HEART DISEASE. Second Edition. Samuel A. Levine, M.D., F.A.C.P. Assistant Professor of Medicine, Harvard Medical School: Senior Associate in Medicine, Peter Bent Brigham Hospital, Boston; Consultant Cardiologist Newton Hospital; Physician New England Baptist Hospital, Boston. 495 pages. Illus. Price, $6.00, cloth. Philadelphia: W. B. Saunders Co., 1940.

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